He that more of thine Excellence wou'd k
On this thy Book let him ſome thoughts be
Deep Queſtions in Arithmetick here are
Demonſtrated by Rules ſo plain, ſo rare,
Envy it ſelf muſt needs confeſs thus much
Read all the Books it'h World you'l
none ſuch.

He that more of thine Excellence wou'd k
On this thy Book let him ſome thoughts beſ
Deep Queſtions in Arithmetick here are
Demonſtrated by Rules ſo plain, ſo rare,
Envy it ſelf muſt needs confeſs thus much
Read all the Books it'h World you'l
none ſuch.

A

N

Bei
t
f

By

The
ſe
F
la

LON
t
M
w
th
ya

HODDER's
ARITHMETICK:
OR, THAT
Neceſſary ART
Made moſt Eaſy.

Being explained in a way familiar
to the Capacity of any that deſire
to learn it in a little time.

By *James Hodder*, Writing-Maſter.

The Twenty Eighth Edition, *Reviſed,
Augmented, and above a Thouſand
Faults Amended, by* HENRY MOSE
late Servant and Succeſſor to the Author

LONDON: Printed for *N* and *M. Boddington* at
the *Golden Ball* in *Duck Lane*; B. *Tooke*, at the
Middle Temple Gate in *Fleet-ſtreet*; *D. Midwinter*,
at the *Three Crowns* and *B Cowſe*, at
the *Roſe* and *Crown* in St. *Paul's* Churchyard.
1719.

Educ T
20117.19

~~HARVARD COLLEGE LIBRARY
GIFT OF
GEORGE ARTHUR PLIMPTON
JANUARY 25, 1924~~

5-150
23

TO His

REALLY LOVING

AND

Moſt Worthily Honoured

FRIEND,

JOSIAS DEWYE,

Merchant *and* Citizen

OF

LONDON:

James Hodder,

In token of true Gratitude for
unmerited Kindneſſes,

HUMBLY DEDICATETH

THIS

Manual of Arithmetick.

TO THE READER

Having for ſundry Years kept a Wr ting School in this City, and there gained ſome Experience in th commendable Art, I thought good heretofo to publiſh ſomewhat thereof.

And now for the better compleating of Yout as to Clerkſhip and Trades, I am induc'd to pu liſh this ſmall Treatiſe of Arithmetick, *whic tho' it be dedicated more particularly to my mu honoured Friend; yet being aſſured he can content that others ſhould partake of the Ben fit thereof, I make bold thus to communicate*

I need not go about to ſpeak any thing Praiſe of Arithmetick, *but ſhall willingly ſu mit what is here treated of to the cand Cenſure of the moſt judiciouſly ſkilful.*

And as I ſhall condemn no Man's Diligenc what he hath formerly done; ſo I think none w blame my Endeavours at the preſent; for tho' know it is impoſſible to pleaſe every Man, an therefore am not ſollicitous how to do it; yet, a cording to the Ability which God hath given m

I ha

I hav
of ſo
edge
may
as ſ
with
as an
Th
Ma
to u
Uſe,
Rat
ratio
hou
hall
erve
deſir

I have laboured to make a more clear Diſcovery f ſome Intricacies in this Art, than to my Know-edge hath hitherto been. Which, tho' parhaps it may not ſeem to be ſet out in ſo gallant a Dreſs s ſome others; yet I dare aver to be done with as much Plainneſs, Facility, and Shortneſs, s any that I have yet obſerved.

Thus, not fearing gentle Reader, leſt any Man ſhould ſcorn my Labours, becauſe I ſeem o undervalue them, by letting others have the Uſe, Profit, and Pleaſure thereof at ſo ſmall a Rate, I refer my ſelf, and them, to thy Conſide-ation; and if after Peruſal and Trial made, hou kindly accepteſt what I lovingly offer, it hall abundantly ſatisfy him that is devoted to erve God, and profit others in his Calling, and eſires to remain,

Ready to pleaſure thee,

whether known, or unknown to

JAMES HODDER.

The Corrector to the Reader.

SInce this Arithmetick came out, it hath ſufficiently demonſtrated to the World its Uutility and facile Method; and therefore needs no further Commendation than what the Learner (thro' it's eaſy Inſtructions) may have cauſe to give it.

And yet notwithſtanding the World hath been fully ſatisfied with the Method thereof, many have been laid under great Diſcouragements (ſome thro' Ignorance blaming the Author) for Multitudes of Faults that have crept in by the Neglect of the Preſs, and ſome by pretending to a Perfection in the ſaid Art, before they have attained to it by a Practical Habit.

Now (*Courteous Reader*) thou may'ſt chearfully go on, all its former Errors being purged from it, and ſome more Light given to it, being augmented in ſeveral Places where Occaſion (for thy ſake) did require. And that it may anſwer thy Expectations, is the Deſire of him who is a Lover of Ingenious Arts.

HENRY MOSE

T

To my Ingenious Friend Mr. *Henry Moſe*, upon his Amendments to Mr. *James Hodder's* Arithmetick.

THIS Critick Age excludes things obſolete,
Now nothing takes wanting a Dreſs compleat
Beauty, tho, unadorn'd, is Beauty ſtill,
Enrich'd with Splendour, captivates each Will.
So he that wou'd careſs this knowing Age,
And means t' appear in Print upon the Stage,
Ev'n in this Harveſt time, when Learning, Arts,
And Wits are ripe, and the ſublimeſt Parts
Are now arriv'd at what they can aſpire,
At which Ages to come may well admire)
Muſt emulate what hath been done before,
And muſter thoſe Aquirements which in ſtore
Lay dormant. This thy Pen hath fully done ;
Th'aſt added to his Fame, and to thine own :
For amplifying his elab'rate Piece,
Multiplies thy Worth, not ſubtracting his.
Imbeliſhing the Work, is to Create
A laſting Progeny in diſpight of Fate.
The Author's Mantle doth invelop thee,
And when the future grateful Age ſhall ſee,
That by Accompliſhments thou doſt inherit
A double Portion of thy Maſters Spirit :
Poſterity ſhall make account it owes
To Hodder's *Memory, but much more to* Moſe.

S. HODDER.

A TABLE ſhewing the Contents of this Book.

CHAP. I. THE *Definition of Numbers and Numeration, with an eaſy Table thereunto belonging.*

Chap. 2. *Addition of Money, Meaſures, Weights,* &c.

Chap. 3. *Subtraction of Money, Meaſures, Weights,* &c.

Chap. 4 *Multiplication with the uſe thereof, laid down in a very plain and eaſy Metho for young Learners; never before extant.*

Chap. 5. *Diviſion the common Way, an the Uſe thereof; alſo another kind of Diviſio more brief, eaſy, and linea.*

Chap. 6. *Reduction of Money, Meaſure Weights,* &c. *with very eaſy ways to find ou the Tare and Neat.*

Chap. 7. *What Fractions are, how expreſ' and the ſeveral ſorts thereof.*

Chap. 8. *Reduction of Fractions; an why Reduction is before Addition*

Chap. 9. *Addition of Fractions the common Way, and two other Ways more expedient*

Chap. 10. *Subtraction of Fractions*

Chap.

Chap. 11. *Multiplication of Fractions.*

Chap. 12. *Diviſion of Fractions.*

Chap. 13. *The Rule of Three direct and Indirect, in whole Numbers, wrought four ſeveral Ways; with a Direction how to work any Queſtion upon the Rule of Three, without troubling the Head with the Diſtinction of Direct and Indirect.*

Chap. 14. *The Rule of Three in Fractions.*

Chap. 15. *Practice with very plain and eaſy Tables.*

Chap 16. *The Double Rule of Three, conſiſting of Five Numbers.*

Chap 17. *Very brief Rules for Intereſt, and Intereſt upon Intereſt; alſo by the help of a plain Table to know what any Sum of Money comes to, Intereſt upon Intereſt for 21 Years or under, at one working, by the Rule of Three.*

Another Table to know what any Annuity will amount unto for the ſame time, at one working, by the ſaid Rule.

Chap. 18. *The Rule of Fellowſhip, or Company without Time, and Fellowſhip with Time.*

Chap. 19. *The Rule of Barter.*

Chap. 20 *Equation of Time for Payment of Money.*

Chap. 21. *Rebate or Diſcount.*

Chap. 22. *Exchange of Money from one Coun-*

try

A TABLE ſhewing the Contents of this Book.

CHAP. 1. THE Definition of Numbers and Numeration, with an eaſy Table thereunto belonging.

Chap. 2. Addition of Money, Meaſures, Weights, &c.

Chap. 3. Subtraction of Money, Meaſures, Weights, &c.

Chap. 4 Multiplication with the uſe thereof, laid down in a very plain and eaſy Metho for young Learners; never before extant.

Chap. 5. Diviſion the common Way, an the Uſe thereof; alſo another kind of Diviſio more brief, eaſy, and linea.

Chap. 6. Reduction of Money, Meaſure Weights, &c. with very eaſy ways to find ou the Tare and Neat.

Chap. 7. What Fractions are, how expreſ'd and the ſeveral ſorts thereof.

Chap. 8. Reduction of Fractions; an why Reduction is before Addition

Chap. 9. Addition of Fractions the com mon Way, and two other Ways more expedient

Chap. 10. Subtraction of Fractions

Chap

Chap. 11. *Multiplication of Fractions.*

Chap. 12. *Diviſion of Fractions.*

Chap. 13. *The Rule of Three direct and indirect, in whole Numbers, wrought four ſeviral Ways; with a Direction how to work any Queſtion upon the Rule of Three, without troubling the Head with the Diſtinction of Direct and Indirect.*

Chap. 14. *The Rule of Three in Fractions.*

Chap. 15. *Practice with very plain and eaſy Tables.*

Chap 16. *The Double Rule of Three, conſiſting of Five Numbers.*

Chap 17. *Very brief Rules for Intereſt, and Intereſt upon Intereſt; alſo by the help of a plain Table to know what any Sum of Money comes to, Intereſt upon Intereſt for 21 Years or under, at one working, by the Rule of Three.*

Another Table to know what any Annuity will amount unto for the ſame time, at one working, by the ſaid Rule.

Chap. 18. *The Rule of Fellowſhip, or Company without Time, and Fellowſhip with Time.*

Chap. 19. *The Rule of Barter.*

Chap. 20 *Equation of Time for Payment of Money.*

Chap. 21. *Rebate or Diſcount.*

Chap. 22. *Exchange of Money from one Coun-*

try

to another, and to know at what Rate the Exchange is made either of Money or Ware.

Chap. 23. *To know what is gained or loſt* per Cent. *in the Sale of any Commodity at ſuch a Price; and what it muſt be ſold for to gain or loſe ſo much* per Cent. *Likewiſe having gained or loſt ſo much* per Cent. *to know what it coſt.*

And having gained ſo much per Cent. *when ſold at ſuch a Price, what ſhall be gained or loſt when ſold at another Price.*

Chap. 24. *Aligation Medial, and Alternate.*

Chap. 25. *Instructions for the Meaſuring of any Superficies, as Board, Glaſs, Hangings, Pavements,* &c. *As alſo the Meaſuring Solids, as Timber, Stone,* &c.

HODDER

Hodder's ARITHMETICK.

CHAP. I.

The Definition of Numbers.

A Number is a Multitude of Units put together, as 2, 3, 4, 5, 6, *&c.* Therefore an Unit is properly no Number, but the Original or ginning of Number, for it being mul- lied or divided by it ſelf, is reſolved in into it ſelf, without any Increaſe- nt or Decreaſement.

NUMERATION.

Numeration is that Part of Arithmetick ereby one may rightly value, expreſs, and ite any Number or Sum propounded.

To the attaining whereof, obſerve, that Numbers are expreſs'd by theſe Chara- rs following, whoſe ſimple Value by themſelves conſider'd, you may here tak notice of.

one,	*two,*	*three,*	*four,*	*five,*	*ſix,*	*ſeven,*	*eight,*	*nine,*	*cypher*
1	2	3	4	5	6	7	8	9	0

The Cypher ſerveth to make up the number of Places, but of it ſelf ſignifieth nothing.

Every figure hath two values, whereo one is always certain, and hath its own ſignification; but the other is uncertain, by reaſon of the uncertainty of the plac where it may happen to ſtand.

A place we commonly call a ſpace i which a figure ſtandeth; and look ho many figures there are, ſo many place there are by which they are valued.

Every Figure in the firſt place ſimpl betokeneth it ſelf: but in the ſecond Plac which is towards the left hand, it is te times ſo much as it was in the Place befor and ſo increaſeth its value according to i place, as you may ſee in the Table follo ing.

Numeration *Table.*

C. *Millions.*	X. *Millions.*	*Millions.*	C. *Thouſands.*	X. *Thouſands.*	*Thouſands.*	*Hundreds.*	*Tens.*	*Units.*	
9	8	7.	6	5	4.	3	2	1	The firſt place.
9	8	7.	6	5	4.	3	2	1	987 *Mil.* 654 *thou.* 321
	9	8.	7	6	5.	4	3	2	98 *Mil.* 765 *thou.* 432
		9.	8	7	6.	5	4	3	9 *mil.* 876 *thou.* 543
			9	8	7.	6	5	4	987 *thouſand* —654
The				9	8.	7	6	5	98 *thouſand* ——765
left hand					9.	8	7	6	9 *thouſand* ——876
						9	8	7	——987
							9	8	——98
								9	——9

Which you muſt read beginning from the laſt Place on the left hand, and proceeding to the firſt at the right, in this manner, *viz.* Nine hundred eighty ſeven Millions, Six hundred fifty four thouſand, Three hundred twenty one.

And for the better underſtanding of the Table, obſerve that the firſt figure next the right hand is the place of Units, and ſignifies but its own ſingle value; as the figure of 1 but one, 2 but two, 3 but three, *&c.* But where two or more figures are joyned together, the figure in the ſecond place towards the left hand betokeneth its own ſingle value ten times; and ſo in the third place ſignifies his own value an hundred times; in the fourth place a thouſand times.

Example. 6. In the fourth place is ſix thouſand, 6 in the third place is ſix hundred, 6 in the ninth place is ſix hundred Millions.

And thus you ſee the value of the figure is according to the place it ſtandeth in.

The names of the places therefore you muſt be ſure to get by heart.

To help you in the expreſſing of great numbers, you may make a period or prick, with your Pen between every three figures beginning at the right hand; as in this Example.

123. 456. 789. Here you ſee is one hundred twenty three, four hundred fifty ſix, ſeven hundred eighty nine. Thus you muſt expreſs all figures: But to know the value of them, you muſt begin at the right-hand, and reckon towards the left according to the precedent Table and you will

find them to be one hundred twenty three millions, four hundred fifty ſix thouſand, ſeven hundred eighty nine.

There are three Sorts of Numbers:

1. A Digit.
2. An Article.
3. A mixt or Compound.

All Numbers not exceeding the nine Units are called Digits; as 1, 2, 3, 4, 5, 6, 7, 8, 9.

Articles are numbers conſiſting of a Digit and a Cypher; as 10, 20, 30, 40, 50, 60, *&c.*

A Compound is a number conſiſting of both; as 13, 14, 15, 16, 17, *&c.*

CHAP. II.

ADDITION.

Without the leſſer Denominations.

BEfore I begin to acquaint you with the working of any of the Rules following, I ſhall (all along in their proper Places) firſt ſhew you the nature and meaning of the Rules, and ſecondly the Manner of their working.

What Addition teacheth.

Addition teacheth you to add two or more Sums together, to make them one whole or total Sum, *viz.*

Example.

Recived at ſeveral times theſe particular Sums following: *viz.*

At one time ——————— 341
At an other time ——————— 158
More ——————————— 217
More ——————————— 596
More ——————————— 179

I deſire to know how much was received in all } ——————— 1491

I. For the working of this and all others of this kind, you muſt begin with the firſt or lowermoſt figure at your right-hand, ſaying 9, 6, 7, 8, and 1, makes 31 ; then ſet down the 1 in a Line underneath, and carry the 3 unto the next place, where 7, 9, 1, 5, 4, and 3 that I carried makes 29, which 9 ſet down, and carry the 2 unto the next place towards your left-hand ſaying, 1, 5, 2, 1, 3, and 2 that I brought make 14, which ſet down. So that you ſee all the particulars do make 1491.

A General Rule.

For Sums of one Denomination in Addition, obſerve to ſet down all that is above Ten or Tens, and under Ten: and for every Ten carry one to the next place, until you come to the laſt, which muſt always be ſet down as in the former Example, and this following appeareth.

```
 2734
 3945
 6542
 5763
 9278
 1712
─────
29974
─────
```

Here I think it not amiſs to adviſe you to be ſure for your clearer working to ſet down the figures of every rank in a ſtreight Line under one another; as you ſee in the foregoing Sums, Units under Units, Tens under Tens, *&c.*

Addition of Money with the leſſer Denominations.

II. I need not here to acquaint you that four Farthings make a Penny, twelve Pence a Shilling, and twenty Shillings a Pound.

But thus much I deſire you to mind i all Additions and Subtractions, the Tit of your Account, and how many of th firſt Denomination do make one of the ſecond, & how many of the ſecond do mak one of the third; and how many of th third do make one of the fourth; and ſo i this manner, if there are more. The Obſervation of this will much facilitate th Work, and ſave both you and me a grea deal of Labour; therefore I ſhall only giv one or two Examples of each caſt up t your hands.

For the effecting of this, conſider, a before, how many of the firſt Denomination do make one of the ſecond, (whic is here 20;) therefore for every 20 Shillings carry one Pound to the Pounds, a thus; 1, 6, 8, 7, and 1 Shilling is 23 Shillings; then come down upon the Ter and ſay, 23 and 10 is 33, and 10 is 4 and 10 is 53, and 10 is 63, and 10 is 7 and 10 is 83 Shillings: now 83 Shilling being 4 Pound 3 Shillings, ſet down onl the 3 Shillings, and carry 4 to the nex ſaying, 9, 1, 8, 1, 7, and 4 that I carrie in my mind, is 30, ſet down 0, and carr the 3 to the next, ſaying, 1, 7, 3, 2, an

3 I carried, is 16; ſet down 6, and carry 1 to the next, ſaying, 3, 4 1, 1, 1, 3, and 1 that I carried, is 14; which by reaſon there is not any other Place to carry it unto, only ſet it down according to this Example.

l.	*s.*
327	11
101	10
100	17
138	18
471	16
319	11
1460	03

As before, ſo again conſider the Title of your Account, and how many of the one do make the other; then begin with the firſt Figures at your right-hand, 5, 7, 1, 8, and 1, which being added together make, 22 and coming down upon the tens, ſay, 22 and 10 is 32, and 10 is 42, and 10 is 52, (and ſo on if there were more.) Now conſider how many Shillings 52 Pence make; *viz.* 4 Shillings and 4 Pence; ſet down the 4 pence, and carry the 4 Shillings to the Shillings, ſaying, 4 that I carry, and 8 is 12, and 7 19, and 1 is 20, and 3 is 23, and 6 is 29, and 1 is 30; then come down upon the Tens, 40, 50, 60, 70, 80, and 10 is 90 Shillings, which is 4 Pounds 10 Shillings; ſet down the 10 Shillings and carry the 4 Pounds to the Pounds, ſaying 4 and 6 is 10, and 1 is 11, and 5 is 16, and 7 is 23, and 1 is 24, which 4 ſet down and carry the 2 unto the 9, which will make 11, and 4 is 15, and 6 is 21, and 4 is 25, and 1 is 26, and 1 is 27, which ſet down, and the total amouts to 274 *l.* 10 *s.* 4 *d.* as you may ſee in this Example,

l.	*s.*	*d.*
11	11	11
10	16	08
47	13	10
65	11	11
41	17	07
96	18	05
274	10	04

You may make a Prick with your Pen at every 4 in the Farthings, and at every 12 in the Pence, and at every 20 in the Shillings. But this way is neither ſo neat nor commendable; for if you once prick falſe, you muſt prick it all over again, which will

look

ok like ſo many Blots, and make you ore ſubject to miſtake.

Therefore I recommed theſe two Tables llowing to you, to be gotten perfectly by eart, before you adventure upon Addition, s one Shilling is 12 pence, 2 Shillings is 4 Pence, and ſo on.

Note, that

s.		*d.*
1	—is—	12
2	—is—	24
3	—is—	36
4	—is—	48
5	—is—	60
6	—is—	72
7	—is—	84
8	—is—	96
9	—is—	108
10	—is—	120
11	—is—	132
12	—is—	144

Note alſo, that

d.		*s.*	*d.*
20	—is—	1—	8
30	—is—	2—	6
40	—is—	3—	4
50	—is—	4—	2
60	—is—	5—	0
70	—is—	5—	10
80	—is—	6—	8
90	—is—	7—	6
100	—is—	8—	4
110	—is—	9—	2
120	—is—	10—	0

The Proof of Addition.

Add all the ſums again (except the uppermoſt) which is here 300 *l.* 11 *s.* 6 *d.* 2 *q.* and then add the Total thereof unto the ſaid uppermoſt Line, and if it make the jnſt Sum of the firſt Total, it is true, otherwiſe not.

Example.

	l.	*s.*	*d.*	*qrs.*
	300	11	06	2
	102	15	11	1
	106	17	10	0
	241	18	11	1
	601	11	11	1
	314	10	10	2
	611	11	11	1
Total	2279	19	00	0
	1979	07	05	2
Proof	2279	19	00	0

Addition of Cloth-Meaſure.

III. *Note, That* 4 *Nails is* 1 *Quarter of Yard,* 1 *Yard* 4 *Quarters,* 1 *Ell Flemiſh* 3 *Quarters of Yard,* 1 *Ell Engliſh* 5.

You ſee the Title of your Account is Yards, Quarters, and Nails; now obſerve how many Nails make one Quarter which is 4; therefore for every 4 carry 1 Quarter to the Quarters; and likewiſe for every 4 Quarters, which make a Yard, carry 1 Yard to the Yards and in the Yards (or laſt Denomination of any Addition) for every 10 carry 1 to the next place, until you come to the laſt Rank; which Total ſet down, as in theſe Examples,

Yards.	*Quar.*	*N*
371	1	1
106	3	2
410	2	3
716	3	1
151	2	3
171	1	2
412	1	1
601	3	2
912	1	3
———	———	———
3855	1	2

Yds. Qrs. Na.	*El. Eng. qr. na.*	*El. Fl. qrs. na.*
31—1—2	47—1—2	54—1—2
27—2—3	———	16—2—1
14—1—2	31—2—3	31—1—2
16—1—3	41—4—3	91—2—1
35—3—1	17—1—2	31—2—3
27—2—0	38—3—1	———
———	27—1—0	226—1—1
153—0—3	———	———
———	203—4—3	
	156—3—1	
	———	

Proof—203—4—3

Addition of Wine Meaſure.

IV. The ſame Order that is ſet down in the ſecond Section of this Chapter, is here to be obſerved; and likewiſe in all the Additions following.

Example.

For 2 Pints carry 1 *Quart, for 2 Quarts* 1 *Pottle, for 2 Pottles* 1 *Gallon, for 63 Gallons* 1 *Hogſhead, for 4 Hogſheads* 1 *Tun.*

	Tuns.	*hogſh.*	*gal.*	*pott.*	*qts.*	*pints.*
	321	3	16	1	0	1
	102	1	10	1	1	0
	217	1	15	0	1	1
	241	2	30	1	0	1
	317	1	40	1	1	1
	171	3	10	0	1	1
	141	2	10	1	0	1
	131	1	17	1	1	0
Tot.	1745	0	27	0	0	0
	1423	1	10	0	1	0
Pr.	1745	0	27	0	0	0

Ad-

Addition of Troy Weight.

For 24 Grains carry 1 Penny Weight, for 20 Penny Weight 1 Ounce, for 12 Ounces 1 Pound.

℔	℥	*pw.*	*gr.*
371	11	19	23
102	10	10	11
413	11	16	10
176	03	19	11
912	10	18	10
341	11	13	22
2320	00	18	15

℔	℥	*pw.*	*gr.*
41	10	17	10
31	11	14	11
10	10	15	15
11	11	11	10
10	10	17	16
107	07	16	14

Addition of Averdupoize Weight.

For 16 Ounces carry 1 Pound, for 28 Pounds carry 1 Quarter, for 56 Pounds 2 Quarters, for 84 Pounds 3 Quarters, for 112 Pounds 4 Quarters (or one Hundred Weight) for 20 Hundred 1 Tun.

Example.

C.	grs.	℔.	℥.
91	3	27	15
10	1	16	14
11	2	10	10
31	1	11	12
71	1	11	10
10	3	15	11
227	02	10	08

Tuns.	C.	*grs.*	℔.	
91	19	3	17	1
16	11	1	11	1
91	11	2	11	14
60	14	3	10	11
31	11	2	11	1
78	10	1	13	13
41	11	2	11	11

Addition of Dry Meaſures.

For 16 *Pints carry* 1 *Peck ; for four Peck carry* 1 *Buſhel.*

Buſh.	*Peck.*	*Pin.*
317	1	10
102	3	11
413	2	10
171	1	11
106	3	10
1112	1	04

Buſh.	*Pec.*	*Pin.*
400	1	10
103	2	10
710	1	11
317	1	10
106	3	11

Addition of Time.

For 60 Minutes carry one Hour, for 24 Hours one Day, and for 365 Days one Year.

Years	*Days*	*Hours*	*Min.*
37	150	11	12
31	110	10	10
14	175	15	23
10	101	11	11
11	137	12	14
10	101	11	13
115	046	23	23

Addition of Long Meaſure.

For 12 Inches carry 1 Foot, for 3 Feet 1 Yard.

Yards	*Feet*	*Inches*	*Yards*	*Feet*	*Inches*
81	1	10	300	2	11
17	2	11	101	1	10
10	2	07	602	2	11
31	1	10	101	1	10
41	2	11	101	0	08
10	0	10	710	1	11
			810	2	10
194	0	11			

CHAP. III.

SUBTRACTION of Money.

SUbtraction teacheth to take any leſſe Number out of a greater, and how to know what remains.

I. *Subtraction of one Denomination.*

Firſt ſet down the greater Number fro which you would ſubtract, and then plac the leſſer Number to be ſubtracted unde it, as in Addition, with a Line drawn beneath them.

Example, Received———379
Laid out———136

Then take the firſt figure towards th right hand in the Sum to be ſubtracte from the figure over it; as 6 from 9 an there remains 3, which 3 ſet down; the 3 from 7 and there remains 4. Laſtly, from 3 and there remains, which 2 ſe down.

———379
———136

And there remains unpaid—243

But I ſhall give you one or two Examles, wherein the figures of the Sum to be btracted, are ſome of them greater and ome leſſer than thoſe you muſt ſubtract rom; therefore if there be only one Denoination, borrow 10 and add to the upper gure; as in this Example.

Received———130624
Paid out———104146

Remains———026478

Say 6 from 4 I cannot, but 6 from 14 and here remains 8, which ſet down; 1 that I orrowed and 4 makes 5, 5 from 2 I canot, but 5 from 12 I may take, and there emains 7; which 7 ſet down. Then 1 that borrowed and 1 is 2, 2 from 6 and there emains 4; now 4 from 0 I cannot, but 4 rom 10 & there remains 6; then one that borrowed and 0 is 1, now 1 from 3 and here remains 2. Then laſtly 1 from 1 nd there remains 0.

o that if you take 104146 from 130624 here remains 26478.

II. *Subtraction of ſeveral Denominations.*

But if there be ſeveral Denominatio then obſerve, as before in Addition of M ney, how many of the firſt make one of t ſecond, and ſo on. And if the Figure Figures be greater than thoſe you are ſubtract from, borrow 1 from the ne Denomination, and ſubtract from it; a add the Remains to the upper Figure.

	l.	s.	d.
Received	275	11	03
Laid out	196	12	05
Remains	078	18	10

Example. Take 5 *d.* from 3 *d.* I canno but 5 *d.* from a Shilling or 12 *d.* and the remains 7 *d.* which added to the 3 makes 10 *d.*

Again, one Shilling that I borrowed (fo you muſt be ſure to pay what you borrow and 12 is 13, which to take from 11 I not; then ſay 13 *s.* form 20 *s.* & th re- mains 7, and the 11 makes 18, which ſe down.

Again, 1 that I borrowed and 6 is 7 ;
7 from 5 I cannot, but 7 from 15, and
re remains 8. Then 1 that I borrowed
9 is 10 ; now 10 from 7 I cannot, but
from 17, and there remains 7, which
down. Then 1 that I borrowed and 1
2 : 2 from 2 and there remains 0.

	l.	*s.*	*d.*
So that	196	12	05
ing taken from	275	11	03
ere remains	078	18	10

And thus in any other of this nature ob-
ve that the ſame you carried in Ad-
ion, the ſame you muſt borrow in Sub-
ction : as 12 in the Pence, 20 in the
illings, and 10 in the laſt Denomination.
I need ſay no more, only I ſhall acquaint
u how to know whether your Work be
ll done or no.

Proof of Subtraction.

Add the Remains to the Sum ſubtra-
ed, and if it make the ſame Sum with that
[illegible] you did ſubtract, it is true, elſe not.
[illegible] he laſt Example, 78 *l.* 18 *s.* 10 *d.*
d 19[illegible] *l.* 12 *s.* 5 *d.* being added, do make
e ſame Sum with the Sum received,

Sub-

Subtraction of Cloth-Meaſure.

	Yards.	*qrs.*	*na.*		*Ells Flem.*	*qrs.*
Bought	3712	1	2	Bo.	4171	2
Sold	1913	2	1	So.	1317	2
Rem.	1798	3	1	Rem.	2853	3
Proof	3712	1	2			

	Ells Eng.	*qrs.*	*na.*
Bought	4716210	2	1
Sold	1091317	3	3
Remains	3624892	3	2

Subtraction of Averdupoize Weight

For the better underſtanding of Rule, obſerve (as you did before) the tle of your Account ; and where you not take one number out of another, it out of the next Denomination ; as ſee here, 12 from 10 I cannot, but Drams from 1 Ounce there reſteth 4, the 10 makes 14 ; 14 from 11 I cann

t 14 from 16 and there remains 2; 2
d 11 is 13. Now one that I borrowed
d 14 is 15; 15 from 11 I cannot, but
from 28 and there remains 13; 13
d the 11 is 24. Now 1 that I borrowed,
d 3 is 4; 4 from 2 I cannot, but 4 from
and there remains nothing, but 2 is 2,
hich you muſt ſet down. Now 1 that I
rrowed and 8 is 9; 9 from 7 I cannot,
t 9 from 17 and there remains 8. Now
hat I borrowed and 1 is 2, 2 from 4
there remains 2.

	C.	*qrs.*	lb	*oun*	*dr.*
ught	47	2	11	11	10
d	18	3	14	13	12
mains	28	2	24	13	14

CHAP. IV.

MULTIPLICATION.

The Multiplication-Table.

2 times	2	is	4
	3		6
	4		8
	5		10
	6		12
	7		14
	8		16
	9		18
3 times	3	is	9
	4		12
	5		15
	6		18
	7		21
	8		24
	9		27
4 times	4	is	16
	5		20
	6		24
	7		28
	8		32
	9		36
5 times	5	is	2
	6		3
	7		3
	8		4
	9		4
6 times	6	is	3
	7		4
	8		4
	9		5
7 times	7	is	4
	8		5
	9		6
8 times	8	is	6
	9		7
9 times	9	is	8
10 times	10	is	10

I. Fo

FOR the clearer underſtanding of this Table, obſerve the Figures in e Margent, 2, 3, 4, *&c.* and the Word imes] adjoyning to them; ſay 2 times 2 4, 2 times 3 is 6, 2 times 4 is 8, 2 times is 10, *&c.* After you know well how to ad it within Book, you muſt of neceſſi- get it very perfectly by heart, before u can make any farther Progreſs in this rt.

The Uſe of Multiplication.

Multiplication ſerveth instead of many Ad- tions, and teacheth of two Numbers given increaſe the greater as often as there are nits in the leſſer.

There are three things ſtrictly to be ob- rved, *viz.*

1. The *Multiplicand*, or Sum to be multiplyed.
2. The *Multiplyer*, or Sum by which you multiply.
3. The *Product*, or Sum produced.

Ask how much is 7 times 52, or in 52 eeks how many Dayes there are?

If you ſhould add 7, 52 times it would

be a tedious Work; but Multiplication wi
do that at once, which Addition ſhould d
at many times; in Multiplication therefo
firſt ſet down the greateſt Number and t
leſſer under it, beginning at the right han
and Multiply every Figure of the Mult
plicand, by each Figure of the Multiplie
then (do as in Additon) ſet down all th
is under Ten, or above Ten, or Tens, a
for every Ten (or Article) carry one
the next place, and in the laſt place
the Tens:

Example.

52 *Multiplicand.*
7 *Multiplier.*

364 *Product.*

Begin with the Multiplier, ſaying
times 2 is 14, ſet down the 4 under the
and carry 1 to the next place ſaying
times 5 is 35. and 1 that I carried is
which ſet down as you ſee in the Examp
ſo that 7 times 52 is 364.

In 3712 Shillings, how many Farthin
or how much is 48 times 3712;

Be careful in ſetting the Figures of
Multiplier under the Multiplicand,

nits muſt be under Units, Tens under
ns, Hundreds under Hundreds ;
d having rightly placed your
gures, then proceed according
your former Example, ſaying,
times 2 is 16, ſet down 6, and
rry 1 to the next Place, ſay then
times 1 is 8, and 1 that I carried is 9, ſet
wn 9, and carry nothing, ſaying, 8 times
is 56, ſet down 6 and carry 5 to the
xt Place, ſaying, 8 times 3 is 24, and 5 is
, which ſet down. And having done
th the firſt Figure of the Multiplier, can-
l it with a daſh of the Pen, and
oceed to the next, ſaying 4
mes 2 is 8, which 8 ſet down di-
ctly under the Multiplier. then
y, 4 times 1 is 4, which ſet
wn, then 4 times 7 is 28, which
ſet down, and carry 2 ; then
times 3 is 12, and 2 that I car-
ed is 14; which being ſet down,
u ſhall find 48 times 3712 to
178176.

```
 3712
   48
-----
29696
```

```
  3712
    48
------
 29696
14848
------
178176
------
```

How to Multiply by 10, 100, 1000 10000, *&c.*

Look how many Cyphers you have i your Multiplier, add them to your Mul plicand, and the Total thereof ſhall be t Product.

Example.

Multiply	by	facit
63	10	630
36	100	3600
85	1000	85000
92	10000	920000
73	100000	7300000

How to Multiply by 20, 40, 300, 5000, &

As many Cyphers as there are in t Multiplier, ſet them down towards t right-hand, and multiply the reſt as bef is taught.

Example.

37	232
20	300
740	69600

H

How to prove Multiplication.

Friſt caſt away the Nines of the Multi- cand, (in your former Example) 3712, ing, 3 and 7 is 10, caſt away 9 and there mains 1 ; then 1 & 1 is 2, and 2 is 4, ich ſet on the right ſide of a Croſs, thus:

×4

Then caſt away the Nines of the Multi- ier, ſaying, 4 and 8 is 12, caſt away the 9 d there remains 3, which place on the t Side thus :

3×4

Then multipy the one by the other, ing, 3 times 4 is 12, caſt away 9 and ere remains 3, which place at the Top the Croſs, thus :

3
3 × 4

Laſtly, caſt away the Nines of the Pro- ct, ſaying, 1 and 7 is 8, and 8 is 16, caſt ay 9 and there remains 7 ; then 7 and 1 8, and 7 is 15, caſt away 9 and there re- ins 6 ; then 6 and 6 is 12, caſt away 9 d there remains 3, which place at the Bot- n of the Croſs, and if the top Figure & e bottom be alike, your Work may be true.

This is the common way to prove Mul- lication : But the moſt certain Proof is by Diviſion, as hereafter I will ſhe you.

II. Yet for the more perfect underſtanding of Multiplication, I have here laid i down in the nature of the *Golden Rul* which though it be not according to th uſual Method of Teaching; yet the Exp rience I have had thereof ſheweth me that it will inform any one more throughly in the nature of this Rule, then any Di rections I have yet read; for Tryal hereo take ſundry Examples, wrought only b multiplying ſecond & third Numbers t gether, as theſe following.

Example.

If 1 yard coſt 17*d.* what coſt 40 Yards?

```
        17
       ———
       280
       40
       ———
facit  680 d.
```

If one Pound coſt 19*d.* what coſt 112 lb?

```
          19
        ————
        1008
        112
        ————
facit   2128
```

f 1 Shilling make 12*d.* what 20*s.* ?
20

facit 240 *d.*

f 1 Shilling make 48 *qrs.* what will 20*s.* ?
20

facit 960 *Farthings.*

f 1 Crown be 60*d.* what 500 Crowns ?
60

30000 *d.*

f 1 Yard be 16 Nails, what 576 Yards ?
16

3456
576

9216 *Nails.*

f 1 Ell *Eng.* make 20 *Na.* what 246 Ells ?
20

facit 4920 *Na.*

f 1 Gall. make 8 Pints, what 63 Gallons ?
8

facit 504 *Pints.*

f 1 Hogsh. make 63 Gall. what 4 Hogsh.
4

facit 252 *Gallons.*

If 1 Tun make 252 Gallons, what 20 Tun
20

facit 5040 Gallons ?

If 1 Inch be 3 Barly-Corns, what 12 Inche
3

facit 36

If 1 Foot be 12 Inches, what 379 Feet ?
12

facit 4548

If 1 Yard be 3 Feet, what 478 Yards ?
3

facit 1434

If 1 Furlong be 40 Poles, what 846 Fur
40

facit 33840

If 1 Mile be 8 Furlongs, what 100 Miles
8

facit 800

If 1 Pound be 12 Ounces, what 176 lb
12

facit 2112

f 1 Ounce be 20 Penny-Weight, what 12
Ounces. 20

facit 240

f 1 Penny-Weight be 24 Grains, what
20 Penny-Weight. 20

facit 480

f 1 Pound be 16 Ounces, what 112 Pounds?
16

672
112

facit 1792

f 1 Quarter be 28 Pounds, what 4 Quarters?
4

facit 112

f 1 C. be 112 Pounds, what 20 C.
20

facit 2240

f 1 Tun be 20 C. what 846 Tuns?
20

facit 16920

If 1 C. groſs alloweth 15 Pound Tares, what will 72 C. groſs ?

15

360

72

facit 1080 ℔. *Tare.*

If 1 C. groſs give 13 Pound Tare, what will 96 C. groſs give ?

13

288

96

facit 1248

If 1 Dollar be 56 *d.* what 500 Dollars ?

56

3000

2500

facit 28000 *Pence.*

If 1 *French* Crown be 6 *s.* what 866 ?

6

facit 5196

f 1 ℔. coſt 37 *d.* what coſt 475 ℔.?

37

3325

1425

facit 17575

CHAP. V.

DIVISION.

DIVISION is that by which we know how many times a leſſer Sum s contained in a greater.

The Parts of Diviſion.

In Diviſion obſerve,
1. The *Dividend.*
2. The *Diviſor.*
3. The *Quotient.*
4. The *Remainder.*

1. The *Dividend* is the Sum to be divided.

2. The *Diviſor* is the Sum by which e divide.

3. The *Quotient* is the Sum produced, and containing ſo many times the *Diviſor*, as it ſelf is in Value.

4. The *Remainder* is always leſs than the *Diviſor.*

Firſt, Set down the Dividend, & right under it towards the left hand the Diviſor.

Example.

Being to divide 4648 Half-pence by 2, the Number of Half-pence in a Penny.

I firſt ſet down the Dividend, and then the Diviſor under the firſt Figure thus;

4648 (
2

But if the Figure or Figures juſt over the Diviſor, be leſs than the Figures under it, the Diviſor muſt be removed one Degree or Place more towards the right-hand.

Example.

I would divide 4648 Farthings by 48, the Number of Farthings in a Shilling, then I muſt ſet my Diviſor thus;

4648 (
48

And at the end of the two Numbers make a crooked Line wherein to include the Quotient, thus (

Yet before you begin your Work, conſider three Things, *viz.*

1. *Seek how often the Diviſor is contained in the Dividend.*

2. *Multiply the Quotient & Diviſor together*

3. Subtract the Product from the Dividend.

To propound then the former Example. In 4648 Half-pence, if I would know ow many Pence.

$$\cancel{4}648\ (2$$
$$\cancel{2}$$

I muſt ſeek how many times 2 is contain- d in 4, which is twice; then I ſet 2 in the uotient, and multiply it by the Diviſor, ying 2 times 2 is 4; now 4 from 4 and here remains nothing; which 2 having rformed its firſt Office, I cancel with a aſh of the Pen, and remove it one place earer the right-hand, thus;

$$\cancel{4}648\ (23$$
$$\cancel{2}2$$

Then I ſay again, how many times 2 n 6, which is 3 times; I ſet down 3 in he Quotient, and Multiply by 2, ſaying, times 2 is 6; now 6 from 6, and there emains 0.

Again I remove the Diviſor, thus,

$$\cancel{4}\cancel{6}48\ (23$$
$$\underline{\cancel{2}\cancel{2}2}$$

---

than

ght un-
iſor.

e by 2,
ny.
d then
hus;

ver the
nder it,
egree of

by 48,
Shilling,

Number
include

k, conſi

contained

together

and try how many times 2 in 4; whic is two times, therefore I ſet 2 in th *Quotient*; and Multiply it by 2 (th Diviſor) ſaying, 2 times 2 is 4, now from 4, and there remains 0.

~~464~~8 (232
~~222~~

Again, I remove the Diviſor, and try again how often 2 is contained in 8, which is 4 times, I ſet 4 in the *Quotient*, & multiply it by 2, ſaying, 4 times 2 is 8 : now 8 from 8, and there remains 0.

~~464~~8 (2334
~~2222~~

Another Example with one figure.

Suppoſe there is 398 Pounds to be equally divided between 6 Men, the Demand is what each Man muſt have?

Firſt, I ſet down the Dividend 398, and 6 (the Diviſor) under the 9 thus, becauſe I cannot take 6 out of 3.

398 (6
 6

Then I try how many times 6 I can have in 39, which is 6 times, I place 6 in the Quotient beyond the crooked Line, ying, 6 times 6 is 36; now 36 from 39, d there remains 3, which I ſet down over e 9, and cancel the 39 and 6 my Diviſor, hus,

$$\begin{array}{l} \quad 3 \\ \cancel{3}\cancel{9}8\ (6 \\ \quad \cancel{6} \end{array}$$

Again, I remove my Diviſor to the next lace under 8, and ſeek how many times I can have in 38, which is alſo 6 times, ſet 6 in the Quotient, ſaying, 6 times 6 s 36, 36 from 38, and there remains 2, hich 2 I ſet over the 8, and cancel the 6 thus.

$$\begin{array}{l} \quad \cancel{3}\ (2 \\ \cancel{3}\cancel{9}8\ (66 \\ \quad \cancel{6}\cancel{6} \end{array}$$

So that every man muſt have 66 *l.* and 2 *l.* over, which I may turn into Pence, & divide alſo by 6, and the Quotient will be 80 Pence, which is in all 66 Pound 6 Shillings and 8 Pence a piece.

This Order I obſerve to divide by one Figure, but if the Diviſor do conſiſt of more Figures than one, I muſt take the firſt Figure of the Diviſor no oftner out of the Dividend

than

then I can alſo take all the reſt of the Diviſ out of the Dividend that ſtands above them, in the Examples following may appear.

But before you proceed to divide by Figures or more, be careful to underſtan well how to divide by one.

How to prove Multiplication.

In Multiplication I told you, that the moſ certain Proof for that Rule, was by Diviſion I ſhall therefore take the Product of one o the Multiplications before going, & divid it by the Multiplier thereof, to try th former Work; as for Example.

I would divide 178176 by 48, which was one of the former Products in Multiplication, which Numbers place as in th Example following.

178176 (
48

Firſt I ſeek how many times 4 is contained in 17, which I find 4 times; now 4 times 4 is 16; 16 from 17, and there remains 1, which makes the 8 to be but 18 now 4 times 8 is 32; 32 from 18 I cannot; therefore 4 times is too much.

2. I ſeek whether 3 times will do it, ſay-
g, 3 times 4 is 12; now 12 from 17, and
ere remains 5, which makes the 8 to be
8; then I ſay 3 times 8 is 24: now 4 from
, and there remains 4, then 2 that I carry
om 5, and there remains 3.

3
~~5~~4
~~1~~~~7~~8176 (3
~~4~~8

3. I remove the Diviſor one place nearer
he right Hand, ſaying, how many times
in 34, which is 7 times (becauſe 9 or 8
imes are too many) then 7 times 4 is 28;
ow 28 from 34, & there remains 6; then
times 8 is 56; 6 from 1 I cannot, but 6
rom 11, and there remains 5; Then 5 I
arry'd, and 1 I borrowed is 6, now 6
rom 6, and there remains 0.

~~3~~0
~~5~~~~4~~5
~~1~~~~7~~8~~1~~76 (37
~~4~~88
~~4~~

Again, I remove the Diviſor, ſaying,
how

how many times 4 in 5, which is onc then I ſay once 4 is 4. Now 4 from 5 there remains 1. Then once 8 is 8; no 8 from 17, and there remains 9, & 1 th I borrowed from 1, there remains nothin

~~3~~6~~1~~
~~5~~459
~~1~~~~7~~8~~1~~~~7~~6 (371
~~4~~888
~~44~~

Again, I remove the Diviſor, & ſeek ho many times 4 is in 9, which is twice ſaying 2 times 4 is 8; now 8 from 9 and there re mains 1: Then 2 times 8 is 16; now 16 fro 16, and there remains nothing. So that find the Quotient to be 3712, the ſame a the Multiplicand was in the Multiplication which is a moſt certain Proof of that Rul

How to prove Diviſion.

~~3~~6~~11~~
~~5~~45~~9~~ (0
~~1~~~~7~~8~~1~~~~7~~~~6~~ (3712
~~4~~888~~8~~ 48
~~444~~
29696
14848

Proof—178176

And as Diviſion is a ſure Proof of Mul-
plication; ſo Multiplication is the ſureſt
roof of Diviſion, which is performed by
ultiplying the Quotient with the Divi-
or; and if the Product thereof be the ſame
ith the Dividend, your Diviſion is well
rought, otherwiſe be ſure ſome Error is
ommitted in your Work.

Alſo if any Figures remain after your Di-
iſion is ended, they muſt be added to the
roduct of your Multiplication, according
o their ſeveral Places, & then (if true) the
otal will be likewiſe the ſame with the
ividend; as, for Example, doth appear
n the laſt Sum of this Rule.

A more eaſie way of Diviſion, and with fewer Figures.

There are 4648 *Shillings to be equally di-
vided betwixt* 34 *Men: I demand what is
ach Man's Proportion?*

I will not ſtand to ſhew you more of this
common way of Diviſion, which is indeed
very tedious & burthenſome to the Memo-
ry, and hath cauſed (to my Knowledge)
many to deſpair of attaining of it, & ſo of
pro-

proceeding further in this Art. But proceed by the Method following, which wi enable one to go on with far more eaſe an delight than commonly is ſeen.

The Queſtion being ſtated is to be ſet thu

$$\begin{array}{l} 4684\,(\\ \;\;34 \end{array}$$

Wherein conſider how often 34 is contained in 46, which is once (or rather ſee firſt how often 3 is contained in 4, which likewiſe is once) then ſet 1 in the Quotient, ſaying, once 4 is 4; now 4 from 6, & there remains 2; which 2 ſet directly over its Dividend.

$$\begin{array}{l} 12 \\ \cancel{4}\cancel{6}34\,(1 \\ \cancel{3}\cancel{4} \end{array}$$

Then go backward to the next, ſaying, once 3 is 3, 3 from 4 & there remains 1, which alſo ſet over the 4, and cancel it, and 3 the Diviſor, with a daſh of the Pen, as you ſee in the Example.

Then remove the Diviſors one Degree further towards the right hand, thus:

$$\begin{array}{l} 12 \\ \cancel{4}\cancel{6}84\,(1 \\ \cancel{3}44 \\ 3 \end{array}$$

Then conſider how often 3 is contained 12, which is 4 times; but 4 times the ext Diviſor cannot be taken out of 8, and ou muſt never take one of the Diviſors ftner than you can take all the eſt; ſeeing then 4 times is too uch try (in your Mind) wheher each Diviſor can be taken times, if ſo then place 3 in he Quotient, ſaying, 3 times 4 12, 12 from 8 I cannot, but 2 from 18 and there remains 6; then 3 imes 3 is 9, and 1 that I carried is 10, 10 rom 12 and there remains 2.

~~2~~
~~12~~6
~~46~~84 (13
~~344~~
~~3~~

Again, remove your diviſor towards our right hand: thus,

2
~~12~~6
~~46~~84 (13
~~3444~~
~~33~~

Then conſider how often three is contained in 26, which is 8 times, and 8 imes 3 is 24; now 24 from 26, and here remains 2, which 2 will make he next Figure to be but 24; then 8 imes 4 is 32, 32 out of 24 cannot be, and therefore ſay 8 times is too much which ſeeing ſo: try (in your mind) whether 7 will do it, ſaying 7 times 4 is 28 28 from 4 I cannot, but 28 from 34, an there remains 6. Then 7 times 3 is 21, an 3 that I carried is 24; 24 from 26, an there remains 2. Cancel out the Dividen and Diviſor, and ſet the remains over head and your Work is done.

$$\begin{array}{l}\cancel{2}\,(\,2\\ \cancel{1}\cancel{2}\cancel{6}\,(\,6\\ \cancel{4}\cancel{6}\cancel{8}\cancel{4}(137\\ \cancel{3}\cancel{4}\cancel{4}\cancel{4}\\ \;\;\cancel{3}\cancel{3}\end{array}$$

The *Quotient* ſheweth that 34 Men mu have 137 Shillings a Piece, & 26 Shilling over & above to be divided amongſt them

Which Remainders, and all others of a Diviſion, I ſhall ſhew you what they are wh you practice Fractions, as the place more convenient and proper.

4 *Example.*

There is a Ship taken by 346 *Seamen, whic is valued at* 87654 l. *to be equally divide amongſ*

mongſt them, I demand what each Man
uſt have?

87654 (
346

Conſider how many times 346 is con-
ined in 876, which is two times, or ra-
her how often 3 is contained in 8, which
likewiſe 2 times; ſet 2 in the Quotient,
nd ſay, 2 times 6 is 12; 12 from 6 I can-
ot, but 12 from 16 and there remains 4.
Then 2 times 4 is 8, and 1
hat I borrowed is 9; 9 from
I cannot, but 9 from 17, &
here remains 8. Then 2 times
is 6, and 1 is 7; 7 from 8,
nd there remains 1. Then having done
ith the Diviſors, remove them to the
ext place towards the right hand: thus,

184
87654 (2
346

Then ſay how many times
in 18? 6 times, but that
eing too much, becauſe (all
he reſt cannot be taken ſo
ften) therefore ſay 5 timees
is 30; 30 from 5 I can-
ot, but 30 from 35, & there remains 5.

184
87654 (2
3466
34

Then 5 times 4 is 20, and 3 that I bor-
rowed

Borrowed is 23 ; 23 from 4 I cannot, b
23 from 24 and there remains 1.

11

~~1~~8~~4~~5

8~~765~~4 (25

~~3466~~

~~34~~

Then 5 times 3 is 15, and 2 that I borrow ed is 17 ; 17 from 18 and there remains

Again, remove the Diviſors (ponde ing in your Mind) now many times can I have in 11, three times ; by whi I perceive 3 will do it,therefore place it the Quotient, ſaying, 3 times 6 is 18 ; from 4 I cannot, but 18 from 24 and the remains 6 : Then 3 times 4 is 12, and that I carried is 14 ; 14 from 5 I cann but 14 from 15 and there remains 1 : The 3 times 3 is 9 and, and 1 that I carried 10 ; 10 from 11, and there remains 1.

(1

~~11~~ (1

~~1~~8~~45~~ (6

~~87654~~ (253

~~34666~~

~~344~~

~~3~~

5. E

5 Example.

There is a City taken in the Wars by 9034 *ldiers, that is worth* 7306242 l. *I demand hat each Soldier muſt have?*

7306242 (
9034

Here you ſee that 9034 cannot be con-ined in 7306; therefore remove your iviſor to the next Place towards the ght hand, thus:

7306242 (
9034

1. Conſider how many times 9 can be d in 73, which is 8 times; place 8 in e Quotient, ſaying, 8 times 4 is 32, 32 ut of 2 I cannot, but 32 out of 32 and here remains 0.

Then 8 times 3 is 24, and 3 that I bor-owed is 27; 27 from 6 I cannot, but 27 om 36 and there remains 9.

Then 8 times 0 is 0, but 3 that I carri-d is 3, 3 from 10 and there remains 7.

790
~~73062~~42 (8
~~9034~~

Then 8 times 9 is 72, and 1 that I bor-owed is 73; 73 from 73, and there re-mains 0.

Again, remove your Diviſor.

Here you alſo ſee, that 9034, the Diviſor, cannot be taken out of the Dividend therefore cancel it, & remove it to the ne Place, ſetting a Chypher in the Quotien

790
7306242 (80
90344
903

Then try again how often the Diviſor contained in the Dividend, which is 8 time

Then ſay, 8 times 4 is 32 ; 32 out of 2 cannot, but 32 out of 32, and there remain

Then 8 times 3 is 24, and 3 that I borrowed is 27 ; 27 from 4 I cannot, but 2 from 34, and there remains 7.

(6 (7
790 (7 (0
7306242 (808
903444
9033
90

Then 8 times 0 is 0, but 3 that borrowed is 3 ; 3 from 0 I cannot, but 3 from 1 and there remains 7.

Th

Then 8 times 9 is 72, and one that I orrowed is 73; 73 from 79, and there reains 6. So that every Soldier muſt have r his Share 808 Pounds.

6 Example.

What is the Quotient of 56037478, *Divided by* 2306803?

Conſider how often the Diviſor is conined in the Dividend, which is here twice.

$$\begin{array}{l} 990141 \\ \cancel{5}\cancel{6}\cancel{0}\cancel{3}\cancel{7}\cancel{4}\cancel{7}8\ (2 \\ \cancel{2}\cancel{3}\cancel{0}\cancel{6}\cancel{8}\cancel{0}\cancel{3} \end{array}$$

Then ſay, 2 times 3 is 6, 6 from 7, nd there remains 1.

Then 2 times 0 is 0; 0 from 4, and here remains 4.

Then 2 times 8 is 16; 16 from 7 I canot, but 16 from 17, and there remains 1.

Then 2 times 6 is 12, and 1 that I borowed is 13; 13 from 3 I cannot, but 13 om 13, and there remains 0.

Then 2 times 0 is 0, but 1 that I borowed is 1; 1 from 0 I cannot, but 1 om 10 and there remains 9.

Then 2 times 3 is 6, and 1 that I borrowed is 7 : 7 from 6 I cannot, but 7 from 16 and there remains 9.

Then 2 times 2 is 4, and 1 that I borrowed is 5 : 5 from 5, and there remains nothing

Remove the Deviſor.

Again, Conſider how many times the Diviſor is contained in the Dividend which is 4 times.

```
     67420
    9901416
  56037478 (24
  23068033
   230680
```

Then ſay, 4 times 3 is 12 ; 12 from I cannot, but 12 from 18 and there remains 6.

Then 4 times 0 is 0, but one that I borrowed is 1 ; 1 from 1 and there remains 0,

Then 4 times 8 is 32 ; 32 from 4 I cannot, but 32 from 34 and there remains 2

Then 4 times 6 is 24, and 3 that borrowed is 27 ; 27 from 1 I cannot but 27 from 31 and there remains 4.

The

Then 4 times 0 is 0, but 3 that I borrowed is 3; 3 from 0 I cannot, but 3 from 10, and there rmains 7.

Then 4 times 3 is 12, and 1 that I borrowed is 13; 13 from 9 I cannot, but 13 from 19 and there remains 6.

Then 4 times 2 is 8, and 1 that I borrowed is 9; 9 from 9 & there remains 0: So that the Quotient is 24, or the Diviſor is contained in the Dividend 24 times.

Having laid down the latter Part of the former Rule in the nature of the Rule of Three, and apprehending it very neceſſary for young Learners, I ſhall therefore obſerve the ſame here in Diviſion, which is performed by Dividing the ſecond Number by the first, and the Quotient is the anſwer to the Queſtion.

If 63 Gallons make 504 Pints, what 1 Gallon?

504 (8 *Pints.*
63

If 4 Hogſheads makes 252 Gallons, what 1 Hogſhead?

1
252 (63 *Gallons*
44

If 20 Tuns make 5040 Gall. what 1 Tun

~~1~~

~~50~~40 (252 *Gallons.*

~~222~~0

If 72 C. groſs allow 1080 Pound fo
Tare, what muſt 1 C. allow?

~~36~~

~~1080~~ (15 *Pounds facit,*

~~722~~

~~7~~

If 152 C. coſt 760 Pounds, what 1 C

~~760~~ (5 *Pounds facit.*

~~152~~

If 500 Dollars be 28000 *d.* what 1 Dollar

~~3~~

~~28000~~ (56 *Pence facit.*

~~5500~~

As in Multiplication, when the Multiplier is 10, 100, 1000, *&c.* you add to the Multiplicand on the right hand ſo many Cyphers as are in the Multiplier, to make the Product; ſo in Diviſion, when the Diviſor is 10, 100, 1000, *&c.* you muſt cut off ſo many Figures from the Dividend to the right hand (with a perpendicular Line) as there are Cyphers in the Diviſor, and the Figures to the left hand are the Quotient. Divide 375900 by 10, or 100, *&c.*

Quot. 37590‖0 *Quot.* 3759‖00

I ſhall not (I hope) need to trouble my ſelf, or Larner, to ſhew the Working of this Sum, or any ther, haveing now (as I ſuppoſe) ſufficiently reated of Diviſion ; but will leave it to the Cenure of the moſt experienc'd to judge, whether this Manner of Dividing be not plain, lineal, and to e wrought with fewer Figuers than any which commonly taught : As for Example appeareth.

```
                        (8
                      97 (5
                    9863 (0
                  987529 (3
                98764181 (0
              9378520609 (8
           9876542195987 (6
         49382714848765 (4
       2469135786376543 (2
     123456789987654321      (1124999999
     98765432111111111         987654321
       987654322222222        124999999
         98765433333343      2499999982
           98765444444       3749999974
             987655555      4999999966
              9876666      6249999958
                98777     7499999940
                  988     8749999933
                    9     9999999920
                         11249999915
                              8
                      ______________________
           Proof       123456789987654321
```

CHAP. VI.

REDUCTION.

1. AS for *Reduction*, though it be n Rule abſolute of it ſelf, bu meerly wrought by Multiplication & D viſion (as I have here manifeſted in plain manner) yet I think good not (al together) to omit it, leſt any ſhould cen ſure me for ſo doing, in regard it is ver uſually practiſed: To deliver ſomewha therefore concerning it.

Reduction teacheth one to bring all groſs o great Denominations into ſmall, and ſmall int great.

Firſt, All great Denominations are brough into ſmall by Multiplication; as,

Pounds multiplied by 20, *are Shillings.*
Shillings multiplied by 12, *are Pence.*
Pence multiplied by 2, *are Half-pence.*
Pence multiplied by 4, *are Farthings.*
Pounds multiplied by 240, *are Pence.*
Pounds multiplied by 480, *are Half-pence*
Pounds multiplied by 960, *are Farthings.*

Second

Secondly, All ſmall Names are brought to great by Diviſion; as,

Shillings divided by 20, are Pounds.
Pence divided by 12, are Shillings.
Half-pence divided by 2, are Pence.
Farthings divided by 4, are Pence.
Pence divided by 240, are Pounds.
Half-pence divided by 480, are Pounds.
Farthings divided by 960, are Pounds.

1000
20
―――
20000 *s.*
12
―――
240000 *d.*
4
―――
960000 *q.*

1. Conſider whether the Sum propound-
d be to be brought into a greater or
ſſer Denomination

2. Conſider how many of the one can
ake the other; as here, how many Shil-
ngs can make a Pound, *viz.* 20; & *contra,*
ow many *Shillings* a *Pound* makes, *viz.* 20.

Therefore of neceſſity there muſt be times ſo many, which being multiplied 20, make 20000 Shillings, & 12, 2400 Pence, and by 4, *facit* 960000 Farthings as in the Example.

In 960000 Farthings, how many Penc Shillings, and Pounds?

~~2~~
~~960000~~ (~~240000~~ (2000|0 *s.*
~~444444~~ (~~222222~~ 1000 *l. facit.*
~~1111~~

To bring Shillings into Pounds (or divide by 20) cut off the firſt Figure towards the right hand with a daſh of th Pen, and take half of the remaining Figures

In 8471213 Farthings, how many Pence Groats, and Nobles?

~~33~~ (1 ~~1312~~ (1
~~8471213~~ ~~2117820~~ (3 (52945|10
~~4444444~~ ~~44444~~ 4
facit 26472 *Nobles.*

Her

Here you ſee the Sum is to be brought
o a greater Denomination than it ſelf,
ich is therefore to be done by Diviſion.
Then you are to conſider what your Di-
or muſt be, which is here 4, becauſe 4
rthings make a Penny ; and as often as
s contained in ſaid Sum, ſo many Pence
ere are.

Your Farthings then being brought into
nce, conſider the next Denomination
hat it is, and how many of the former
ke one of it ; as how many Pence make
Groat, *viz.* 4 ; and look how many times
is contained in the Sum, ſo many Groats
ere are.

Having brought the Pence thus into
oats, endeavour to bring them into No-
es, by conſidering how many Groats make
Noble *viz.* 20 ; therefore divide by 20,
by cutting of the firſt Figure towards the
ht hand, and taking the half of the reſt)
d your Quotient will be Nobles.

I ſhall ſay no more as to Reduction of
oney, only leave two or three Queſtions
r the Learner to practice upon.

In 100 *l.* how many Farthings, Pence,
illings, Three-pences, and Nine-pences ?

In 47162 Marks, how many Nobles, Pounds, Groats, Farthings, 6 *d.* and 2 *d.?*

In 7665 *l.* 11 *s.* 10 *d.* how many Shillings, Pence & Pounds, Farthings, Crowns, & *ob.*

Reduction of Cloth Meaſure.

II. *Obſerve in this and all the Reductions following, how many of the one Denomination do make one of the other, and ſo multiply or divide according to the two Rules afore-going in Reduction of Money.*

In 4372 Yards, how many Qrs. & Ells *Flem.*
4

17488 *Qrs.*

~~202~~ (1
~~174~~88 (5829 $\frac{1}{3}$ *facit.*
~~3333~~

In 7862 Ells *Eng.* how many Qrs. and Yards ?
5

39310 *Qrs.*

~~313~~ (2
~~39310~~ (9827
~~4444~~

In 85 Pieces, each 19 Ells $\frac{1}{2}$, how many Qrs. Nails, and Yards ?

Re

Reduction of Wine Measure.

III. In 35 Tuns, how many Hogſheads, Gallons, Pottles, Quarts, and Pints?

35
4
140 *Hogſh.*
63
420
840
8820 *Gallons.*
4
35280 *Quarts.*
2
79560 *Pints.*

In 4712568 Pints, how many Gallons and Rundlets, each Rundlet 11 Gallons?

In 327 Barrels, each 32 Gallons, how many Hogſheads and Tuns?

Reduction of Time.

IV. in 1659 Years, how many Days, Hours, and Minutes?

365 Days a Year.
24 Hours a Day.
60 Min. an Hour.

1659 *Years.*
365

8295
9954
4977

605535 *Days.*
24

2422140
1211070

14532840 *Hours.*
60

871970400 *Minutes.*

In 87167155 Minutes, how many Hours, Days, and Years?

In 20 Years and an half, how many Days, Hours, and Minutes?

Re-

Reduction of Land Meaſure,

In 100 Miles how Poles, Feet, Inches, and Barly-corns ?

8 Furlongs a Mile.
40 Poles a Furlong.
16 ½ Feet a Pole.
3 Feet a Yard.
12 Inches a Foot.
3 Barly-corns an Inch.

100 *Miles.*
8
800 *Furlongs.*
40
32000 *Poles.*
33
96000
96000
½ 1056000 *Half Feet.*
528000 *Feet.*
12
6336000 *Inches.*
3
29008000 *Barly-corns.*

Re-

Reduction of Troy Weight.

VI. In 87 Pound and ½, how many Ounces, Penny-weights, and Grains?

$$\begin{array}{r}
87\text{ lb. } \frac{1}{2}\\
12\\
\hline
174\\
876\\
\hline
1050\ \text{℥}\\
20\\
\hline
21000\ \textit{Pw.}\\
24\\
\hline
84000\\
42000\\
\hline
504000\ \textit{Grains.}
\end{array}$$

In 7151213 Grains, how many Penny-weights, Ounces, and Pounds?

In 15 Ingots, each 7 Pound and ½, how many Ounces, Penny-weights and Grains?

Re-

Reduction of Averdupoize Weight.

VII. In 96 C. Weight, how many Qrs. lb. and ℥?

4

384 *Quarters.*
28

3072
768

10752 *Pounds.*
16

64512
10752

172032 *Ounces.*

In 40 C. ½ 19 Pounds 11 Ounces, how many Qrs. lb. and ℥.

4

162 *Quarters.*
28

1305
325

4555 *Pounds.*
16

27336
4556

72891 *Ounces.*

In 8714 Ounces, how many Pou, Qrs.&C

In 20 Bags, each 3 C ½, how many Qrs and Pounds ? 4

14
28

112
28

392 *Pounds in one.*
20

7840 *Pounds in all.*

Where you find the Word [each] *have ſpecial regard to it, and reduce the Perticulars which it implieth, firſt into one Denomination ; then, when you know how much is contained in one, you may eaſily know how much is in all.*

In 36 Barrels of Figs, each 3 C. ¼ groſs, Tare 19 Pounds *per* Barrel, how many Pounds neat ?

Whether the word [Tare] *imply* per Bag, pe Barrel, *or* per C. *&c. is all one if you keep t your former Rule in Multiplication, by obſerving which you cannot miſs of what you woul know : as here Tare* 19 *Pounds* per Barrel.

Say, if 1 Barrel give 19 Pounds, what 3 Barrels ?

Multi

Multiply 19 and 36 together, and the Product is Pounds Tare; then ſubtract the Pounds Tare from the Pounds Groſs, and he Remains are Pounds Neat.

36 *Barreles.*
19 *Tare for* 1 *Barrel.*
324
36
684 *Tare in all.*

3 C ½
4
13
28
104
26
364 lb. *in* 1 *Barl.*
36
2184
1092
13104 lb. *groſs.*
684
12420 lb *neat.*

In 45 Bags of, &c. each 17 C ½ groſs, are 15 Pound *per* Bag, how many C. neat?

In 47 C. ½ groſs, Tare 17 Pounds *per* C. w many Pound neat?

In 5 Hogſheads of Tobacco, each containing as ſolloweth, how many C. neat *viz.*

Number	containing C.	qrs.	lb	Tare lb
1	4	2	11	6
2	3	1	12	7
3	2	3	16	5
4	4	1	20	7
5	3	2	27	6

In 57120, C. ½ of Lead, how many Fother at 19 C ½ ?

In 5671 Pigs of Lead, each 7 C ½, how many Fother at 19 C ½ ?

Facit 2181 *Fother*

CHAP. VII.

Numerations of Fractions.

THE next Things to be treated of are Fractions :

Concerning which, I ſhall ſhew,

1. What a Fraction is.
2. How it is expreſs'd.
3. How many ſorts of Fractions there are.

A Fraction or broken Number is a Par r many Parts of a whole Number: For as hole Numbers take their beginning from One, nd continue in Number without end; ſo the aid whole Numbers by Imagination may be diſolv'd or broken into Pieces or Parts infinite.

Therefore to attain the knowledge of them, acquaint your ſelf with theſe two Terms, *Numerator* and *Denominator.*

The *Numerator* expreſſes the Number of he Parts.

The *Denominator* giveth thoſe Parts their Names.

1 2 3 Numerator.

2 3 4 Denominator.

Proper Fractions
$\frac{1}{2}$ is the one half of any thing.
$\frac{2}{3}$ is two third parts of any thing
$\frac{3}{4}$ is three quarters of any thing
$\frac{4}{5}$ is four five parts of any thing.

Fractions of Fractions.

Fractions of Fractions have commonly this Word (of) *between them, as* $\frac{2}{3}$ *of* $\frac{3}{4}$, *that is, wo thirds of three quarters.*

If

Improper Fractions.

If the *Numerator* be greater then the *Denominator*, the Fraction improper, and containeth an Unite or Units, or ſome Part or Parts of the *Denominator*, as $\frac{15}{4}$ i three Integers or wholes, and three quarters; but when the *Numerator* and th *Denominator* are alike, they make an Unit.

Though *Addition* in whole Numbe be immediatly after *Numeration*; yet i *Fractions* it is not ſo, becauſe there are, a here you ſee, *Fractions* of ſeveral Sorts which muſt of neceſſity be reduc'd int one Denomination, before they can b added. Therefore, to avoid Diſorder, ſhall firſt ſhew what this Reduction o Fractions is; ſecondly, how to reduce a Fractions to one Denomination or Likeneſ

CHAP. VIII.

REDUCTION of FRACTIONS.

What Reduction is.

REduction *teaches us to bring Integers i Fractions, or contrary; yea, Fractions of vers Denominations into one, or what you li*

I would have reduc'd $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$ of an Ell of vhat you pleaſe, into one Denomination.

To Reduce proper Fractions.

For the effecting of this and all other of his kind, multiply all the Denominators ogether (which Product take for a comnon Denominator) as 2 times 3 is 6, and times 6 is 24, your Denominator.

Then multiply the Numerator of the rſt in all the other Denominators, except s own Denominator; as once 3 is 3, 3 mes 4 is 12, which take for a new Nuerator to the firſt Fraction.

Then multiply the ſecond Numerator in all he Denominators except its own; as 2 times is 4, and 4 times 4 is 16, which likewiſe ke for a new Numerator to the ſecond.

Then multiply the third Numeration in l the Denominators except its own; as 3 mes 3 is 9, 2 times 9 18, which alſo place r a new Numerator to the Third, and our Work ſtandeth thus:

$$\begin{array}{ccc} 12 & 16 & 18 \\ \hline \frac{1}{2} & \frac{2}{3} & \frac{3}{4} \\ 24 & & \end{array}$$

So that—— $\frac{12}{24}$ $\frac{16}{24}$ $\frac{18}{24}$ are equal to $\frac{1}{2}$, $\frac{2}{3}$ $\frac{3}{4}$

II. *To*

II. *To reduce Fractions of Fractions into one Denomination.*

Multiply all the Numerators together, and take the Product thereof for a new Numerator, and likewise multiply all the Denominators together, & make the Total a Denominator.

Example.

$$\underset{24}{\overset{6}{\overline{\tfrac{1}{2}\text{ of }\tfrac{2}{3}\text{ of }\tfrac{3}{4}}}}$$

III. *To reduce improper Fractions into whole Numbers.*

Divide the Numerator by the Denominator.

Example.

$$\frac{23}{4}\qquad \begin{array}{c}3\\ 2\cancel{3}\\ \cancel{4}\end{array}\ (5\tfrac{3}{4}$$

IV. *To reduce a whole Number into an improper Fraction.*

Let the Number given be the Numerator, and 1 the Denominator.

Example. Reduce 13 Integers into an improper Fractions: *facit* $\frac{13}{1}$.

To reduce a whole Number join'd with a Fraction into one Denomination.

Multiply the whole Number into the enominator of the Fraction, adding hereunto the Numerator.

Example. 5 Yards and $\frac{3}{4}$ *facit* $\frac{23}{4}$.

I. *To reduce a greater Fraction into a leſſer Term, equivaluable to it ſelf.*

Take the half of the Numerator, and alf of the Denominator as oft as you can, d when you can take the half no further, ke the one third, or the one fourth, or e one fifth, *&c.* both of the Numerator d Denominator.

Example.

I would abbreviate $\frac{24}{120} \| \frac{12}{60} \| \frac{6}{30} \| \frac{3}{15} \| \frac{1}{5} \|$

Take the half of 24, which is 12, then e half of 120, which is 60; again the alf of 12, which is 6, and the half of 60 30, then the half of 6 is 3, and the half 30 is 15: Here you ſee that the half nnot be taken both of the Numerator d Denominator, therefore try whether will be abbreviated by 3, as thus: How many times 3 in 3, once; then how many times 3 in 15, 5 times. ſo that $\frac{1}{5}$ is in the loweſt Denomination, yet it retains the ſame Value; for $\frac{1}{5}$ is equal to $\frac{24}{12}$.

A ſecond kind of Abbreviation.

Though by the former Rule all Fractions might be abbreviated, yet when you cannot take $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{6}$, $\frac{1}{7}$, $\frac{1}{8}$, or $\frac{1}{9}$, &c. they ſeem more tedious by this ſecond way, as ma appear.

I would have this Sum abbreviated, $\frac{30}{41}$ into a leſſer Fraction.

For the reducing whereof, divide the Denominator by the Numerator, and the Remain of the Diviſion will be 1086, by whic divide the former Diviſor 3077; and ther will remain 905, by which divide your la Diviſor 1086, and there will remain 18 by which remains likewiſe Divide the D viſor 905 and there will remain 0.

Where note, that having divided your Denominator by the Numerator, & the Di ſor of every Diviſion ſo often by the R mains, that nothing will remain; then t laſt Diviſor will divide both the Nume tor and Denominator of your Fraction

As in the Example.

$\frac{13077}{4163}$ *facit* $\frac{17}{53}$, equal to the former.

How to reduce or alter any Fraction to another Denomination, as Money, Weight, or Meaſure, &c.

Multiply the Numerator by ſuch a new Denominator or Number which you intend, dividing the Product by the former Fractions Denominator, whoſe Quotient ſhall be Numerator to the Denominator laſt choſen.

Example.

What is $\frac{2}{3}$ of 12 *d* ?

$\frac{2}{24}$ $\frac{24}{3}$ (8 *d.*

What is $\frac{5}{9}$ of 20 Shillings ?
What is $\frac{7}{8}$ of a *Flemiſh* Ell ?
What is $\frac{5}{7}$ of a yard ?
What is $\frac{5}{6}$ of a Tun of Wine ?
What is $\frac{6}{17}$ of a Tun of Iron ?
What is $\frac{9}{10}$ of a Hogſhead of Sack ?
What is $\frac{4}{5}$ of a Dollar at 4 *s.* 8 *d.*

Facit 44 *d* $\frac{4}{5}$.

What is $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ of 5 Shillings ?

$\frac{6}{24}$

Reduce Fractions of Fractions to one ſingle Fraction, and work as before.

I

$\frac{6}{2\cdot4} \| 1\ \frac{3}{2} \| \frac{1}{4}$ of 5 1 *s.* and $\frac{1}{4}$.

4

What is $\frac{4}{5}$ of a Dollar at 4 *s.* 8 *d.*

Facit 44 *d.* $\frac{5}{5}$.

CHAP. IX.

Addition of Fractions.

1. ADdition of Fractions is the putting of two or more broken Numbers into one Sum, or principal Fraction.

In this Rule and the next, obſerve, that all Fractions whatever, proper, or improper, muſt be of one Denomination, or reduced thereto by the former Rules.

2. Being of one Denomination only, add all the Numerators together, which Total ſubſcribe for a new Numerator over the common Denominator.

Example.

Add $\frac{2}{5}$ and $\frac{3}{5}$ of any thing together.
$\frac{2}{5}$ and $\frac{3}{5}$ *facit* $\frac{5}{5}$, or one whole one.

326

60||80||90||97

Add $\frac{1}{2}$ $\frac{2}{3}$ $\frac{3}{4}$ & $\frac{4}{5}$ together, *facit* $\frac{327}{130}$.

120

Reduce them into one Denomination by the firſt Rule of Reduction ; then add the Numerators, as in the laſt Example.

A more ſpeedy Way.

Multiply all the Denominators that differ in Quantity each from other, and the Total thereof ſhall be the common Denominator and Dividend to each particular Denominator, whoſe Quotient multiply into its Numerator, and ſet it directly againſt its own Fraction, and in fine add them all up, which Total ſhall be a new Numerator unto the common Denominator ; and add as many Integers as they make to the whole Numbers.

Example. lb. (24 or 12

lb.	
620 $\frac{1}{4}$	3
271 $\frac{1}{3}$	4
163 $\frac{1}{2}$	6
017 $\frac{3}{4}$	9
710 $\frac{1}{2}$	6
1723 $_{3}$	$\frac{28}{12}$

$\overline{4}$

28 (2

~~22~~

III. *Yet a more ſhort way.*

Caſt your Eye upon the Denominators and imagine what Number will be divided by them all, and that ſhall be your com-mon Denominator; and Dividend unt each particular Denominator; then wor as before in the laſt Examples. (12)

Number 12 will be divided by all the Denominators.

$$\begin{array}{r|l}
472 — \frac{3}{6} & 6 \\
315 — \frac{2}{4} & 9 \\
917 — \frac{1}{2} & 6 \\
106 — \frac{2}{3} & 8 \\
371 — \frac{1}{6} & 2 \\
125 — \frac{1}{4} & 3 \\
\hline
2308 — \frac{5}{6}\ \frac{3|4}{1|2} &
\end{array}$$

10
34 (2
~~12~~

IV. *Addition of Fractions of Fractions.*

Reduce your Fractions into a ſingl Fraction, according to the ſecond Rule Reduction; then work as before.

Example. Add $\frac{1}{2}$ of $\frac{2}{3}$ of $\frac{3}{4}$ unto $\frac{4}{5}$ of $\frac{6}{7}$

$$\begin{array}{c|c|c|c}
6 & 24 & 210 & 576 \\
\hline
\frac{1}{2} \text{ of } \frac{2}{3} \text{ of } \frac{3}{4} \text{ unto } \frac{4}{5} \text{ of } \frac{6}{7} & \colon\ \frac{6}{24}\ \frac{24}{35} & \colon & \frac{210}{57}\ \frac{786}{} \\
\hline
24 & 35 & 840 & \textit{facit } \frac{786}{840}
\end{array}$$

V. A

V. *Addition of Improper Fractions.*

Reduce your Fractions into one Denomination, and work *ut ſupra.*

Example. Add $\frac{5}{4}$ and $\frac{7}{6}$

58

———————

30 28

$\frac{5}{4}$ $\frac{7}{6}$ *facit* $\frac{58}{24}$.

———————

24

VI. *To add a ſingle Fraction unto a Fraction of Fractions.*

Example. Add $\frac{3}{4}$ and $\frac{1}{3}$ of $\frac{4}{5}$ together, $\frac{1}{3}$ of $\frac{4}{5}$ reduce into a ſingle Fraction, according to the ſecond Section in *pag.* 72. and work as before.

61

———————

4 16 45

$\frac{1}{3}$ of $\frac{4}{5}$ $\frac{4}{15}$ and $\frac{3}{4}$ *facit.* $\frac{61}{60}$.

15 60

CHAP. X.

Subtraction of Fractions.

SUBTRACTION is the taking of one Fraction from one another, a leſs from a greater, or an equal from an equal.

1. Becauſe Subtraction teacheth to tak a leſſer Fraction from a greater, it will no be amiſs to ſhew you how to know th one from the other.

2. Thoſe Fractions are accounted th greateſt, whoſe Numerator, multiplied by the Denominator of the other Fractio maketh the greateſt Number.

And as in *Addition*, ſo here, all Fractio to be ſubtracted muſt be of one Denomination, or reduced thereunto.

II. *To ſubtract Fractions of one Denominatio*

Subtract one Numerator from the other, and ſet the Remain over the common Denominator. *Example.*

Subtract $\frac{2}{5}$ from $\frac{3}{5}$ there remains $\frac{1}{5}$

III. *To ſubtract a whole Number and a Fracti from a whole Number and a Fraction.*

Firſt, reduce your Fractions into on Denomination, then ſubtract the one Numerator from the other; and for the Integer, ſubtract as you were taught in whol Numbers.

Example.

Received 30 *l.* $\frac{3}{4}$ Laid out 10 *l.*

$$\begin{array}{cc} \multicolumn{2}{l}{2} \\ \hline 6 & 4 \\ \frac{3}{4} & \frac{1}{2} \\ \hline \multicolumn{2}{c}{8} \end{array} \quad \text{Remains } \frac{2}{8} \text{ or } \frac{1}{4}$$

IV. *Another Way.*

Multiply the Denominators together, & let the Product be the common Denominator, which common Denominator divide by each particular Denominator, & multiply the Quotients by their Numerators, & ſet down Products directly againſt its Fraction, and then ſubtract as if it were in whole Numbers.

As for Example.

Received—100 *l* $\frac{5}{6}$ 25

Spent——93 *l.* $\frac{3}{5}$ 18

Remains——7 $\frac{7}{30}$

V. *When the Fraction to be ſubtracted, is greater than the Fraction you are to ſubtract from.*

Reduce them into one common Denominator (as you did in the laſt Example) and ſubtract the greateſt Numerator from the common Denominator, and add the Remains to the Numerator of the leſs, which ſubſcribe for a new Numerator unto the common Denominator; then carry one to the next Integer, and ſubtract as in whole Numbers.

	l	*s*		C.	
Received	5 —	0	Bought —	16^{1}	7
Paid ——	3 —	$\frac{2}{5}$	Sold ——	14$\frac{3}{7}$	12
Remains	1 —	$\frac{3}{5}$	Remains	1 $\frac{2}{2}$	$\frac{3}{8}$

VI. When Fractions of Fractions, are to be ſubtracted, they muſt be reduced into ſingle Fractions, then ſubtracted as before.

Example. $\frac{1}{2}$ of $\frac{2}{3}$ to be ſubtracted from $\frac{3}{4}$ of $\frac{4}{5}$; being reduced into ſingle Fractions, they are $\frac{1}{3}$ and $\frac{3}{5}$.

$$\begin{array}{ccc} & 4 & \\ \hline 5 & & 9 \\ \frac{1}{2} & & \frac{3}{5} \\ & 15 & \end{array}$$

Re-

CHAP. XI.

Multiplication of Fractions.

IN Multiplication of Fractions, whether they be proper, improper, mixt, or compound, they muſt likewiſe be reduced to ſingle Fractions: Multiply the Numerators therefore together, and the Product ſhall be a new Numerator; then multiply all the Denominators, and the Product thereof ſhall be the Denominator. Ex-

Example
Multiply $\frac{2}{3}$ by $\frac{3}{4}$ | $\quad 6$
$\frac{2}{3}$ X $\frac{3}{4}$ *facit* $\frac{6}{12}$ or $\frac{1}{2}$
$\quad 12$

Itmight ſeem ſomewhat ſtrange to young Learners, that $\frac{2}{3}$ of a Pound being Multiplied by $\frac{3}{4}$ of a Pound, ſhould make but $\frac{1}{2}$; Therefore to inform them, I think meet to acquaint them, that as whole Numbers multiplied by whole Numbers, do increaſe the Product; ſo Proper Fractions Multiplied by proper Fractions do diminiſh the Product: For as 1 multiplied by 1 makes but 1, ſo that which is leſs than 1 being multiplied by that which is leſs then 1, muſt needs make leſs then either of them: or thus,

$$\frac{2}{3}$$
$$\frac{3}{4}$$
$$\frac{6}{12}$$

To Multiply Fractions of Fractions.

II. Reduce them into ſingle Fractions, then work as before.

Example. $\frac{3}{5}$ of $\frac{5}{6}$ by $\frac{1}{2}$ of $\frac{2}{3}$ being reduced, they are $\frac{1}{2}$ and $\frac{1}{3}$, and being multiplied, *facit* $\frac{1}{6}$.

To multiply a whole Number and a Fraction together.

III. Multiply the Numerator by the whole

Number, and divide the Product by the Denominator.

Example. Multiply 4 by $\frac{3}{4}$ $\frac{12}{4}$ (3 *facit.*

To Multiply a whole Number and a Fraction, by a whole Number.

IV. Reduce the whole Number and Fraction into an Improper Fraction, then work as before.

Example. 2 and $\frac{2}{3}$ by 4 *facit* $\frac{32}{3}$, or 10 $\frac{2}{3}$

To multiply a whole Number and a Fraction, by a whole Number and a Fraction.

Reduce each of them into an Improper Fraction, and work as before in *Sect.* I.

Example. Multiply 3 and $\frac{1}{4}$ by 2 and $\frac{1}{3}$. $\frac{13}{4}$ by $\frac{7}{3}$ *facit* $\frac{91}{12}$ or 7 $\frac{7}{12}$

CHAP. XII.

Diviſion of FRACTIONS.

As in Multiplication, ſo in this, all Fractions, that are to be divided, muſt be reduced to ſingle Fractions both for the Dividend or Diviſor : Then ſet that Fraction, which is the Dividend, on the left hand, & that for Diviſor on the right hand ; then multiply croſs-wiſe the Numerator of the Dividend by the Denominator of the Diviſor, and ſubſcribe the Product or a new Numerator: Likewiſe multiply he Denominator of the Dividend by the Diviſor's Numerator, & the Product ſhall be a new Denominator.

Example.

What is the Quotient of $\frac{4}{5}$ divided by $\frac{3}{4}$

Place your Fractions thus, with this ⋈ Character between them, and work according to the Directions before given, $\frac{4}{5} \times \frac{3}{4}$

$$\frac{16}{15}$$

Facit $\frac{16}{15}$, *or one whole one, and* $\frac{1}{15}$

I demand the Quotient of $\frac{2}{3}$ divided by $\frac{3}{4}$?

$$\frac{2}{3} \times \frac{3}{4}$$

Facit $\frac{8}{9}$

In the Diviſion of whole Numbers, the Dividend muſt be always greater than the Diviſor, otherwiſe you can make no Quotient. But in Diviſion of Fractions it is otherwiſe, as in the ſecond Queſtion propounded, $\frac{2}{3}$ to be divided by $\frac{3}{4}$, for $\frac{3}{4}$ is greater or more than $\frac{2}{3}$, yet it may be divided: For as the Multiplication of Proper Fractions (as we ſaid before) doth diminiſh the Product; ſo Diviſion of Proper Fractions doth increaſe the Quotient.

II. To

II. *To divide the whole Number by a Fraction*

I demand the Qoutient of 20 divided by $\frac{1}{2}$;

20. Being the whole Number, convert it into an Improper Fraction, by placing an Unit for a Denominator, and it ſtandeth thus:

$$\frac{1}{2} \bowtie \frac{20}{1}$$

---

facit $\frac{40}{1}$

III, *To divide a whole Number and n Fraction by a whole Number and a Fraction*

I demand the Quotient of five and

divided by $3\frac{1}{4}$?

$$\frac{13}{4} \bowtie \frac{11}{2}$$

---

facit $\frac{44}{26}$

IV. *To divide Fractions of Fractions.*

I demand the Quotient of $\frac{1}{2}$ of $\frac{2}{3}$ of

divided by $\frac{2}{3}$ of $\frac{1}{2}$?

Reduce the Dividend into one ſingle Fractions, and likewiſe the Diviſor; then work as before.

$$\frac{2}{6} \bowtie$$

---

facit $\frac{3}{4}$

CHA

CHAP. XIII.

The Rule of Three.

.THE *Rule of Three* is commonly called, *The Golden Rule*; and indeed t may rightly be ſo termed; for as Gold ranſcends all other Metals; ſo doth this Rule all others in Arithmetick.

II. Now for your better Information oncerning it, you muſt obſerve, that here are three Numbers known, by which fourth that is unknown may be found ut, which bears like Proportion to the hird, as the ſecond doth to the firſt.

III. Here alſo is to be noted, that if our Sums conſiſt of ſundry Denominatins, then the firſt and third Numbers uſt be of the ſame Denomination, as alo the fourth and the ſecond: As thus, If he firſt Number be Yards, the third likeiſe muſt be Yards; if the ſecond be ence, then the fourth muſt be Pence.

IV. But the greateſt Difficulty lieth in ating the Queſtion.

Therefore obſerve firſt, That wha you deſire to know to be reſolv'd in th Queſtion, muſt be your third Number: An you have commonly theſe words before it as, *What coſt? How long? How broad? ho much? How deep?* &c.

2. Your Queſtion being ſtated, brin your firſt and third Numbers into on Denomination.

3. Bring your ſecond into the lea Name mentioned, or as low as you deſir the Queſtion to be anſwer'd in.

4. Obſerve whether your third Numbe *requires more or leſs*; *if more*, then multipl the middle Number by the greater of th two Extremes, and divide by the leſſer, & the Quotient anſwereth the Queſtion.

But if it require a *leſs*, then multiply th middle Number by the leſſer of the tw Extremes, and divide by the greater.

Theſe two Words, *more* or *leſs*, bein well obſerv'd, the Scholar will underſtan what he doth, and need not to make tw diſtinct *Rules of Three*, as moſt do.

The four firſt Queſtions are ſtated fo ſeveral ways, by which the one is a Pro of the other.

An

And as you may eaſily work all the reſt, which will be advantageous to the Scholar, & likewiſe an Eaſe to the Maſter; I ſhall therefore only give you the *Facits* of the following Queſtions.

If 6 Yards coſt 10 *s.* what 12 Yards?

10

120

~~122~~ (20 *Shillings.*

~~66~~

If 12 Yards——20 *s.*——6 Yards?

20

120

~~120~~ (10 *s.*

~~122~~

~~1~~

If 20 *s.* buy 12 Yards, what will 10 *s.*

12

120

~~120~~ (6 Yards.

~~20~~

If 10 *s.* ——6 Yards———20 *s.*

6

120

~~120~~ (12 Yards.

~~100~~

~~1~~

If 6 Men will be finiſhing a Piece o
Work 10 Days, how long will 12 Men
be doing the ſame ?

Men.——*Days.*——*Men.*
6——10——12
10
———
60 ~~60~~ (5 Day
~~12~~

If 12 Men——5 Days——6 Men ?
5
———
60 ~~60~~ (10 Day
~~66~~

If 5 Days——12 Men——10 Days ?
12
———
60 ~~60~~ (6 Me
~~10~~

If 10 Days——6 Men——5 Days ?
6
———
~~1~~
60 ~~60~~ (12 Me
~~55~~

If 2 ℔ coſt 9 *d.* $\frac{3}{4}$, what coſt 2 C. $\frac{1}{2}$?

4	4
39 *qrs.*	10
	28
	80
	20
	280 ℔.
	39
	2520
	840
	10920

~~1~~
~~10920~~ (5460 *qrs.*
~~2222~~

If 280 ℔ ——— 5460 *qrs.* ——— 2 ℔?
2
10920

~~250~~
~~10920~~ (39 (*qrs. facit*
~~2880~~
~~2~~

If 5460 *qrs.* ——— 280 ℔ ——— 39 *qrs*?
280
3120
78
10920

~~10920~~ (2 ℔ *facit*
~~5460~~

10920 If

If 39 Qrs.——2 ℔.——5460 Qrs. ?
2
31 10920
10920 (280 ℔ *facit.*
3999
33

If I ſpend 476 *l.* 11 *s.* 10 *d.* a Year, demand how much that is one Day wi
another ?

Days. *l.* *s.* *d.* *Day.*
If 365——476—11—10——1
20
9531
12
19062
9532
114382 *d.*
(1
12 (3
483 (7
114382 (313 *d.*
36555
366
3

If 1 Day —— 313 *d.* —— 365 *Days.*
313
1095
3657
10953
1
114382 *d.*

If 313 *d.* —— 1 *d.* —— 114382 *d.*
(1
17 (3
2040 (7
114382 (365 *Days.*
31333
311
3
Days.

If 114382 *d.* —— 365 —— 313 *d.*
365
1565
18787
9393
1
114382

4382 (1 *d.*
4382

At 15 *d.* $\frac{3}{4}$ *per* ℔. how many C. weigh
for 11 *l.* 11 *s.* 11 *d.*

Facit 1 C. $\frac{1}{2}$ 14 ℔.

If 9 Ells $\frac{1}{5}$ coſt 27 *s.* 5 *d.* what coſt 8
Pieces, each 25 Yards $\frac{1}{4}$ and 12 Pieces, eac
19 Ells $\frac{3}{5}$?

Facit 275 *l.* 16 *s.* 8 *d.*

If 100 ℔ of Cloves coſt 88 *l.* 11 *s.* 10
and 1 C weight of Mace 99 *l.* 10 *s.* 3
what coſt 3 ℥ one with another ?

Facit 3 *s.* 3 *d.*

If 1 Pair of Stockings coſt 10 Groats, ho
many dozen Pair ſhall I have for 100 Mark

Facit 33 *dozen Pair*

If 7 ℔ $\frac{1}{2}$ of Currants coſt 2 *s.* 7 *d.* wh
coſt 3 Butts, each 15 C. $\frac{1}{2}$ 14 ℔ groſs, Ta
39 ℔ *per* Butt. *Facit* 88 *l.* 8 *s.* 0 *d.*

If 5 Ells $\frac{3}{5}$ of Cambrick coſt 21 *s.* 8
what coſt 120 Pieces.

				Ells. qrs.
Number	A	30	*qt.*	272—2
	B	50	*qt.*	401—3
	C	40	*qt.*	341—1
				1015—2

Facit 196 *l.* 8 *s.* 9 *d.* 3 *q.* $\frac{4}{5}$.

Sold 5 Bags of Pepper, each, *viz.* Tare 43 per Bag, & Tret 4 ℔ *per* 104 ℔ at 15*d.* $\frac{1}{4}$ er Pound neat; what comes it no neat? Alſo I demand how many Dollars of 4 *s.* *d.* a-piece will pay for the neat weight?

			C.	qrs.
Numbef	G	qt.	3	2
	H	qt.	4	1
	L	qt.	5	3
	M	qt.	2	1
	O	qt.	3	3
			19	2

acit 515 *Doll.* $\frac{174}{224}$ or $\frac{87}{112}$

Sold 10 Packs of Cloth, each Pack *qt.* 10 lothes, and each Cloth 39 Yards, at 11 *s.* *d. per* Yard; I demand how much it comes in all? *Facit* 2323 *l.* 15 *s.* 0 *d.*

	C	qrs	℔
Bought of ſeveral Perſons	433	03	17

Currants at 4 *d. per* ℔, to whom I have ld 519 C. 3 *qrs.* 7 ℔ of Sugar at 2*d.* $\frac{3}{4}$ *per* ℔. ow I would know what remains for me to y; they having taken the Sugar in part Payment.

	l.	*s.*	*d.*
	809	19	00
	667	01	10$\frac{1}{4}$
Facit Rem. to pay	142	17	01$\frac{3}{4}$

A

A Merchant died, being indebted to ſeveral Creditors, (*viz.*) to *A.* 40*l.* to *B.* 56*l.* to *C.* 80*l.* Now he being dead, his Eſtate was worth but 30 *l.* I demand what each Man muſt have?

A—$6\frac{144}{176}$
B—$9\frac{96}{176}$
C—$13\frac{112}{176}$

Facit 30 *l.*

Bought 100 Pieces of Cloth for 411 11 *s.* 11 *d.* What containeth the Cloth the Yard being valued at 7 *s.* 8 *d.*

Facit 1073 *Yards*;

If 1 Pound of *Virginia* Tobacco coſt 1 $\frac{1}{2}$, what coſt 3 Hogſheads, weight 17 C. 12 lb. groſs, Tare 37 lb. *per* Hogſhead, & 4 lb. *per* 104 lb. Tret.

Facit 78 *l.* 6 *s.*

Alſo I demand how many Duckets 3 *s.* 9 *d.* $\frac{1}{4}$ will pay for the Neat Weig

Facit 413 *Duckets*,

A Merchant hath owing 357 *l.* 9 *s.* and is Debtor doth agree with him to pay him r every Pound 13 *s.* 5 *d.* I demand what uſt he pay?

facit. 239 *l.* 15 *s.* 9 *d.* $\frac{9}{20}$

A Man died, having three Sons and two aughters, he gave to the eldeſt Son 00 *l.* to the ſecond 1900 *l.* to the third 00 *l.* to the Eldeſt Daughter 700 *l.* to e ſecond 500 *l.* Now, he being dead, his ate was worth but 2020 *l.* I demand ateach Child muſt have?

	l.
Eldeſt Son	662 $\frac{18}{61}$
Second Son	629 $\frac{11}{61}$
Third Son	331 $\frac{9}{61}$
Eldeſt Daughter	231 $\frac{49}{61}$
Second Daughter	165 $\frac{35}{61}$

facit 2020

f I buy a Piece of Cloth for 84 *l.* 11 l I ſell the Ell *Eng.* for 7 *s.* 8 *d.* I de- nd how many Yards were contained in ſaid Piece?

facit 275 *Yards* $\frac{1}{2}$ and $\frac{1}{2}$ *of a qr.*

. Sold 4 parcels of Sugar, containing as
followeth :

	C.	*grs.*	℔.	
The firſt containing	86	2	21	tare 8
The ſecond containing	76	1	12	tare 5
The third containing	98	3	11	tare 9
The fourth containing	75	1	17	tare 8

At 35*s. per C. neat, facit* 585*l.* 6*s.* $\frac{28}{112}$ or 3

If 50 *C.* 3 *grs.* 15 ℔. of Sugar coſt 21
19 *s.* 11 *d.* how many Cheſts of 86 C.
ſhall I have for 1000 Marks and 486 *l.*

facit 30 *Cheſts* and $\frac{9000}{9688}$ *of a Cheſt*

If 5 penny weight of Silver coſt 7 *d.*
what coſt 3 Ingots, each 11 ℔. $\frac{1}{2}$?

facit 50 *l.* 0 *s.* 6

If a Gent. hath 960 *l.* 12 *s. per annum*
how much may he ſpend one day with a-
nother, to lay up 100 Marks at the yea
end to purchaſe withal.

facit 136 *groats* $\frac{318}{365}$ *per di*

A Merchant bought 376 Cloths
11 *l.* 11 *s.* 1 *d. per* Cloth, which he ſhip
for *Spain*, to have returns from thenc
the one half in Wine, at 28 *l per* T
and the other half in Sugar, at 27 *s.*

weight, I demand how much of each
uſt be returned for the ſaid Cloths?

77 *Tuns* $\frac{971}{1680}$ *of Wine.*
1609 C. 2 ℔. $\frac{67}{81}$ *of Sugar.*

There are 101 Pipes of Oyl, that con-
ain 12307 Gallons, I would know how
uch 59 Pipes and $\frac{1}{2}$ will contain, and
hat it will amount to at 36 *l. per* Tun,
he Tun being 236 Gallons.

facit 1105 *l.* 18 *s.* 7 *d.* $\frac{1}{2}$ $\frac{72}{236}$

A Merchant bought 9870 *C.* $\frac{1}{2}$ of Lead,
hich coſt 7 *l.* 8 *s.* 5 *d. per* Fother, (or
9 *C.* $\frac{1}{2}$) the charges upon the ſame a-
ount to 125 *l.* 12 *s.* which he ventures
r *France*, to receive from thence *French*
Vine at 13 *l* 10 *s. per* Hogſhead: I de-
and how many Hogſheads he muſt re-
eive for content.

facit 287 *Hogſheads* $\frac{1769}{3240}$

A Grocer delivered 7657 ℔. of To-
acco in the Roll to be cut and dryed,
nd when it came home, it held out but
839 ℔. I demand what is loſt in the
ound; and alſo ſuppoſing it coſt in the
Roll 8 *d.* $\frac{1}{2}$ *per* ℔. and the cutting

1 *d.* $\frac{1}{4}$ *per* Pound, I demand what it now ſtands him in ?

1 *l.*———9 *d.* $\frac{3}{4}$———7657 *l.*

It ſtands him in 311 *l.* 1 *s.* 3*d.* $\frac{3}{4}$

7657*l.*———1818*l.* ——— 1 *l.*

facit $3\frac{7}{3}\frac{6147}{7657}$ loſt *per* Pound.

CHAP. XIV.

The Rule of Three in Fractions.

AS in the Rule of Three in whole Numbers, I laid down certain Principles both for the better diſcovering, and more eaſie working thereof: So in this of Fractions, I ſhall endeavour to make all things as plain and familiar as may be.

And firſt, becauſe many Quſtions ſeem very ambiguous, whether they belong to the *Rule of Three direct*, or *indirect*.

That you may be rightly informed concerning them, caſt your Eye upon the third Number in the Quſtion, and ſee whether it be greater or leſſer than the firſt Number.

But if you cannot eaſily apprehend which is the greater or leſſer, then work according to the ſecond Section in *pag* 80.

What questions belong to the Rule of Three direct.

If the third Number be greater than the firſt, and the Anſwer required be greater than the ſecond it is upon the Rule of three direct.

And likewiſe if the third Number be leſs than the firſt, and the Anſwer required be leſs than the ſecond, it belongs to the ſame Rule.

What queſtions belong to the Rule of Three indirect.

But if the third Number be leſs than the firſt, and the Anſwer required be greater than the ſecond, it is pertaining to the indirect Rule.

And if the third Number be greater than the firſt, and the Anſwer required leſs than the ſecond, it is according to the ſame Rule.

Having found out to what Rule it belongs, firſt conſider diligently, *viz.* whether the firſt & third Numbers be both of one Denomination, if not they muſt be reduced into the leaſt of theſe Denominations.

2. That your ſecond being a compound Fraction, muſt be reduced into the loweſt or leaſt Name mentioned.

The Operation of the Rule of Three direct.

Multiply the Denominator
the firſt Fraction into the Nu
merator of the ſecond, a
third, and the Total there
ſhall be the Dividend.

Multiply alſo the Numer
tor of the firſt Number by t
Denominator of the ſecond,
that Product by the Denom
nator of the third, & the T
tal ſhall be the Diviſor.

The Operation of e Rule f Three ndirect.

But when the Queſtions
long to the indirect Rule,m
tiply the Numerator of the f
& ſecond together, and
whole thereof by the Deno
nator of the third, & the P
duct ſhall be the Dividend.

Multiply alſo the Denomi
tors of the firſt & ſecond to
ther, and the Total thereof
the Numerator of the third,
the Product that ariſeth th
from ſhall be the Diviſor.

Example.

If $\frac{2}{5}$ of an Ell coſt $\frac{2}{3}$ of a *l.* what coſt $\frac{4}{5}$?

2
10
4
40 *Dividend.*

2
3
2
6
5
30 *Divisor.*

(1 *l*
4(0 $\frac{1}{3}$ *facit.*
30

$\frac{4}{5}$ Ell ———— 1 *l.* $\frac{1}{3}$ ———— $\frac{2}{5}$ Ell?

4
20
||2
40 *Dividend.*

4
3
4
12
5
60 *Divisor.*

$\frac{40}{60}\|\frac{2}{3}$ *l facit.*

$\frac{2}{3}$ *l.* ———— $\frac{2}{5}$ Ell ———— 1 *l.* $\frac{1}{3}$?

2
3
2
6
4
24

2
5
2
10
3
30

1
3
4
3

$\frac{24}{30}\|\frac{1}{1}\,\frac{2}{1}\|\frac{4}{5}$ Ell *facit.*

1 *l.* $\frac{1}{3}$ ———— $\frac{4}{5}$ Ell ———— $\frac{2}{3}$ *l?*

4
3
4
12
2
24

4
20
3
60

$\frac{24}{60}\|\frac{1}{3}\,\frac{3}{6}\|_{5}\,\frac{6}{5}\|\frac{2}{5}$ Ell *facit.*

For the Proof of theſe & the following ueſtions, the ſame Method is to be obſerved,

ſerved as in the Rule of Three in whole Numbers.

If $\frac{1}{2}$ ℔. coſt $\frac{1}{4}$ of a ſhil. what coſt $\frac{3}{4}$ of a ℔

$\frac{3}{6}$ $\frac{4}{16}$

$\frac{3}{1\_3}$ (2 *s.*

x8 (1 $\frac{1}{8}$ *facit.*

x6

If $\frac{2}{4}$ ℔. coſt 1 *s.* $\frac{1}{8}$ what coſt $\frac{1}{2}$ ℔ ?

9
3 4

9
8
3
2 4

$4\,\frac{2}{8}\Big|\frac{3}{4}\,\frac{6}{8}\Big|\frac{1}{2}\,\frac{8}{4}\Big|\frac{}{1}\,\frac{9}{2}\Big|\frac{3}{14}$ of a *ſhilling*

If $\frac{3}{4}$ of a ſhil. buy $\frac{2}{2}$ ℔ what will 1 *s.* $\frac{1}{8}$

9 $\frac{3}{6}$ 9
3 0 8 8 8
4

$\frac{3}{4}\,\frac{6}{8}\Big|\frac{1}{2}\,\frac{8}{4}\Big|\frac{}{1}\,\frac{9}{2}\Big|\frac{1}{4}$ *of a* ℔

If 1 *s.* $\frac{1}{8}$ ——— $\frac{3}{4}$ ℔. ——— ——— $\frac{3}{4}$ *s* ?

9 9
8 3 6
7 3 4
2 4 1 4 4
3
7 2

$\frac{7}{144}\,\frac{2}{4}\Big|\frac{3}{1}\,\frac{6}{2}\Big|\frac{1}{3}\,\frac{8}{6}\,\frac{1}{12}$ *of a* ℔

To prevent Diſcouragement to Young Scholars in the Queſtions of this Rule which are indeed ſomewhat intricate I adviſe them to turn to the Rule of Thre

Three in whole Numbers, and exerciſe themſelves well therein, and eſpecialy in ſuch Queſtions as are moſt plain and eaſie, till they throughly underſtand the Nature of the Rule; by means whereof all other Queſtions will be more eaſily wrought, be they never ſo difficult.

If 6 Yards and $\frac{1}{2}$ coſt 8 Shillings, what coſt 9 Yards and $\frac{1}{3}$?

facit 11 *s.* $\frac{19}{39}$.

If 1 Dollar be 56 Pence $\frac{3}{5}$, what 500 Dollars?

1—56 *d.* $\frac{3}{5}$—500 *facit* 117 *l.* 18 *s.* [illegible]

If 2 Ounces and $\frac{1}{2}$ coſt 16 *s.* 5 *d.* what coſt $\frac{3}{4}$ ℥?

facit 59 *d.* $\frac{1}{10}$.

When the Buſhel of Wheat is ſold for *s.* $\frac{2}{3}$, the Half-Penny white Loaf ſhall weigh 5 ℥. $\frac{11}{12}$: I demand how much it ought to weigh when the Buſhel is ſold for 7 *s.* $\frac{1}{2}$?

6 *s.* $\frac{2}{3}$——5 ℥ $\frac{11}{12}$——7 *s* $\frac{1}{2}$.

facit 5 ℥. $\frac{7}{27}$.

If 1 Yard coſt 9 *s.* [illegible] what coſt 4 Yards $\frac{5}{6}$

facit 43 *s.*

If 3 Ells $\frac{1}{4}$ coſt 15 *d.* $\frac{1}{4}$, what 6 Ells $\frac{3}{4}$

facit 2 *s.* 7 *d.* $\frac{35}{52}$

If $\frac{3}{4}$ of a Yard coſt $\frac{4}{9}$ of a *l.* what coſt $\frac{1}{1}$ of a Yard?

facit 10 *s.* [illegible]

If 3 Yards and $\frac{5}{11}$ coſt 4 *l.* 14 *s.* $\frac{24}{45}$, wh coſt $\frac{6}{7}$ of an Ell *Flemiſh?*

$\frac{60}{4}\frac{5}{1}$ $\frac{42}{4}\frac{54}{5}$ $\frac{72}{7}$ *facit* 17 *s.* $\frac{12331}{19152}$

If 1 lb. coſt 6 *d.* $\frac{1}{3}$, what coſt 4 *l.* $\frac{5}{8}$?

facit 30 *d.*

If 1 Ell $\frac{4}{5}$ coſt 9 *s.* $\frac{7}{8}$ what coſt 1 Yard

facit 4 *s.*

I lent my Friend $\frac{5}{6}$ of a *French* Crow for three weeks, that he ſhould do much for me another time: but when came to borrow of him, he could lend but $\frac{3}{5}$ of a Crown: I demand how lo time I muſt keep his money to requi my former Kindneſs?

facit 4 weeks

If 1 Piſtolet be 5 *s.* $\frac{9}{10}$, what ſhall 430 be? thus,

1 ——— 5 *s.* $\frac{9}{10}$ ——— 430 *facit* 126 *l* 17 *s.*

If 13 ℔. coſt me 3 *l.* how many ℔. ſhall I have for 97 *d.*

facit 1 ℔. $\frac{541}{720}$

If $\frac{3}{4}$ ℔. coſt 9*d.* $\frac{3}{4}$, what coſt 6 ℔. 9 ℥ $\frac{1}{4}$?

facit 342 $\frac{11}{16}$

If 5 Yards of Velvet coſt 4 *l.* 3*d.* $\frac{1}{4}$, what coſt 4 Yards $\frac{6}{7}$?

facit 3 *l.* 17 *s.* 11 *d.* 2 *qrs.* $\frac{32}{39}$

If 1 C $\frac{5}{7}$ coſt 4 *l.* 12 *s.* what coſt $\frac{5}{8}$ C?

$\frac{12}{7}$ ——— 92 *s.* ——— $\frac{5}{6}$ *facit* 33 *s.* $\frac{13}{24}$

If 1 C. coſt 11 *l.* $\frac{8}{10}$, what coſt 4 ℥, $\frac{1}{4}$?

$\frac{7152}{4}$ ℥. ——— $\frac{12}{2}$ $\frac{118}{10}$ *l.* ——— $\frac{17}{4}$ ℥?

If $\frac{3}{7}$ of an Ell coſt 1 *l.* 2 *s.* what coſt $\frac{5}{8}$?

facit 32 *s.* 1 *d.*

If 10 Ells coſt 3 *l.* $\frac{3}{5}$, what coſt 1 Yard?

$\frac{50}{5}$ — $\frac{18}{5}$ — $\frac{4}{5}$ or 50—18—4

If $\frac{1}{4}$ C. coſt $\frac{6}{11}$ of *l.* what coſt 1 C. $\frac{6}{7}$?

$\frac{1}{4}$ ——— $\frac{6}{51}$ ——— $\frac{13}{7}$ *facit*

If $\frac{1}{3}$ of C. coſt $\frac{6}{13}$ *l.* what will 3 *s.* $\frac{7}{8}$ buy?
$\frac{120}{13}$ *s.* —— $\frac{1}{3}$ C. $3\frac{7}{8}$ *s. facit.*

If $\frac{5}{6}$ of a Yard of Cloath in length, and 1 Yard $\frac{3}{4}$ broad make a Childs Coat, I demand how much Stuff will make the ſame Child a Coat, when the Stuff is but $\frac{3}{4}$ of a Yard broad?

7 —— $\frac{5}{6}$ —— 3 *facit* 1 *Yard* $\frac{17}{18}$

If 8 ℔. $\frac{3}{4}$ coſt 2 *l.* 11 *s.* $\frac{3}{7}$, how many ℔. ſhall I buy for 4 *l.* $\frac{1}{6}$?

facit

If $\frac{3}{7}$ of 1 C. coſt $\frac{5}{16}$ of a *l.* what coſt $\frac{1}{5}$ of a Pound?

facit

If $\frac{5}{7}$ of an ℥ coſt $\frac{11}{12}$ of a Penny, how much ſhall I buy for $\frac{6}{11}$ of 20 *s.*?

facit

If $\frac{12}{23}$ of a Pound coſt $\frac{5}{11}$ of a *l.* how many Pounds ſhall I have for 2 *l.* 7 *s.* 3 *d* $\frac{1}{2}$.

facit

How many Yards are bought for 142 *l* 11 *s.* 2 *d.* when the $\frac{1}{2}$ of $\frac{3}{4}$ of a Yard coſ 6 *s.* $\frac{5}{8}$? *facit*

If 1 C $\frac{3}{4}$ 12 ℔. $\frac{1}{3}$ coſt 2 *l.* $\frac{5}{6}$, what coſt $\frac{7}{9}$ of an ℥?

facit $\frac{1}{3}$—$\frac{1}{4}$—$\frac{357}{000}$

If 26 ℔. at *Antwerp* be 27 ℔ $\frac{7}{8}$ at *London*, how many Pounds at *Antwerp* are 56 ℔ at *London*?

facit 52 $\frac{52}{223}$

If 8 Ells at *Antwerp* be 5 Ells $\frac{1}{5}$ at *London*, how many Ells at *Antwerp* are 150 Ells $\frac{7}{11}$?

facit 231 Ells $\frac{107}{143}$.

If 3 $\frac{1}{2}$ times 3 $\frac{1}{2}$ ℔. coſt 1 $\frac{1}{2}$ times 1 $\frac{1}{2}$ *l.* what ſhall amount unto $\frac{1}{2}$ times $\frac{1}{2}$ of the $\frac{1}{3}$ of 12 *l.* $\frac{1}{4}$?

$\frac{49}{4}$—$\frac{9}{4}$—$\frac{49}{48}$ *facit* $\frac{147}{784}$ *of a l.*

If $\frac{1}{3}$ leſs $\frac{1}{6}$ ℔ coſt 2 $\frac{1}{4}$ *l.* and the $\frac{1}{3}$ of $\frac{7}{8}$ ℔. what ſhall 10 ℔ leſs $\frac{1}{5}$ and $\frac{1}{4}$ of 3 $\frac{1}{2}$ ℔. amount unto?

$\frac{1}{6}$—$\frac{172}{64}$—$\frac{357}{40}$ *facit* 135—17—0--3

If a *French* Crown be worth 52*d.* 5 $\frac{1}{2}$ *Sterl.* how many muſt be received for 100*l* $\frac{7}{9}$ *Ster.* Crown.

$\frac{1155}{22}$ *d.* — $\frac{1}{1}$ — $\frac{72560}{3}$

facit 460 Cr. $\frac{44}{63}$.

*W*hen $\frac{1}{5}$ of 5 Ells leſs $\frac{1}{5}$ of an Ell coſt $\frac{1}{8}$ of 9 $\frac{1}{2}$*l.* leſs of $\frac{1}{8}$ of a *l.* what then ſhall $\frac{1}{6}$ of 6 Ell, leſs $\frac{1}{6}$ of an Ell?

$\frac{4}{5}$—, $1\frac{7}{6}$—$\frac{5}{6}$ *facit* 1 $\frac{41}{134}$ *l*

If $\frac{2}{2}$ of 20 lb. coſt 36 *l*, leſs $\frac{3}{4}$ of 30 *l.* I demand how much $\frac{5}{6}$ of 40 lb. & $\frac{1}{2}$, $\frac{2}{3}$, $\frac{3}{4}$ will amount unto?

$\frac{40}{3}$: $\frac{27}{2}$. $\frac{258}{72}$ *facit* 35 $\frac{221}{220}$ *l.*

If an Ingot of ſilver whoſe weight is 60 lb. $\frac{5}{7}$ be better 16 ℥. $\frac{5}{93}$, I demand the Standard weight of the Ingot, alſo the Betterneſs; *Note*, That the Standard is, 11℥ 2 *dwt*. Firſt, ſubtract the Standard-weight from the Betterneſs, then it follows:

$\frac{111}{10}$: $\frac{421}{90}$: $\frac{5100}{7}$

℥.

358 $\frac{2021}{2331}$ *Beeterneſs.*

728 $\frac{1332}{2332}$ *Weight of the Ingot.*

1086 $\frac{1534}{2331}$ *ſtandard weight in ounc*

lb. ℥. *dwt.*

90 : 6 : 13 $\frac{377}{2131}$ *fac*

An Ingot of Silver weight 47 lb, $\frac{3}{4}$ and worſe 14 $\frac{1}{6}$ ℥. I demand the Worſeneſs of the Ingot, aud alſo the Standard-weight.

$\frac{111}{510}$: $\frac{46}{15}$: $\frac{573}{5}$

lb. 13—02 ℥—06 *dwt*.. $\frac{1}{112}$ *worſeneſs*

lb 34—06 ℥—13 *dwnt*, $\frac{92}{211}$ *ſtandard*

CHAP. XV.

RULES of PRACTICE.

Tables of Practice.

	s. d.		
The even parts of a Pound.	10—0	is	1/2
	6—8		1/3
	5—0		1/4
	4—0		1/5
	3—4		1/6
	2—6		1/8
	1—0		1/20

The even parts of a Shilling.	6	is	1/2
	4		1/3
	3		1/4
	2		1/6
	1		1/8
	1 1/2		1/12

BEfore the Learner can well proceed further, he muſt get theſe Tables very perfectly by heart; I might puzzle his Head with ſome others, which, becauſe I conceive would be troubleſome and burdenſome to his memory, therefore I ſhall omit them

2—12—24
3—12—36
4—12—48
5—12—60
6—12—72
7—12—84
8—12—96
9—12--108
10—12--120
11—12--132
12—12--144

them, and obſerve this plain and eaſie Method following.

And firſt I ſhall begin with the even Parts of a Shilling.

I. When the Price is an even Part of a Shilling, conſider what Part of a Shilling it is; which being found, divide the Sum propounded by it, and the Quotient will be Shillings, as in theſe ſix Examples following will appear.

Ells *d.*
8468 at 6 *per* Ell.
½ 423 || 4
211-14-0 *facit.*

867 at 4*d.* *per* Ell.
⅓ 28 || 9
14--9-0 *facit.*

lb.
276 at 3 *d.* *per* lb.
¼ 6 || 9
3-9 *facit.*

lb *d.*
3618 at 2 *per* lb.
⅙ 60 || 3
30— 3 *facit.*

Yards *d.*
2760 at ½ *per* Y.
⅛ 34 || 5
17-5 *facit.*

lb *d.*
4896 at 1 *per* lb.
1/12 40 || 8
20—8 *facit.*

Having gone thus far upon thoſe even Parts of a Shilling that are moſt eaſie. I muſt intreat the Learner to return back to a farthing, an half penny, three farthings, *&c.* the other parts of a Shilling.

II. When the price is Farthings, or Half-pence, bring the given Sum into Pence, and work as before in the laſt Queſtion; but when they are uneven parts, as penny-farthing, penny-three-farthings, two-pence-farthing, or the like: Begin firſt with the even parts of a Shilling: As for inſtance, 6396 Ells at 5 Farthings *per* Ell; work firſt for the penny, as before, then conſider, if at the price of a penny they come to ſo many Shillings, then the Farthing muſt be the forth part of them, which being taken and added together, your work is done.

	Ells.		*Ells*
	420 at $\frac{1}{4}$ *d. per* Ell		716 at $\frac{1}{2}$ *d. per* Ell
$\frac{1}{4}$	105	$\frac{1}{2}$	358
$\frac{1}{12}$	8-9 *d. facie.*	$\frac{1}{12}$	2‖9 10 *d.*
			1-9-10 *facit.*
			Ells.

Ells *d.*
6396 at $\frac{3}{4}$ per Ell

$\frac{1}{2}$ 3198

$\frac{1}{12}$ 266—6 *d.*
$\frac{1}{2}$ 133—3

39||9—9

19-19-9 *facit.*

5712 at 1 *d.* $\frac{2}{4}$

$\frac{1}{12}$ 476
$\frac{1}{4}$ 119

59||5

29—15 *facit.*

Ells. *d.*
7225 at 1 $\frac{3}{4}$ *per* El

$\frac{1}{8}$ 903—1 $\frac{1}{2}$
$\frac{1}{6}$ 150—6 $\frac{1}{4}$

105||3—7 $\frac{3}{4}$

52-13-7 $\frac{3}{4}$ *faci*

III. When any thing doth remain any Diviſion, it is of the ſame Denomin tion as the Dividend was, as here in t laſt Example 7225 three half pence bei divided by 8, there remains one thr half-pence.

8

864 at 2*d.* $\frac{1}{2}$

$\frac{1}{6}$ 144
$\frac{1}{8}$ 18

16 || 2

8-2-0 *facit.*

3714 at 2 *d.* $\frac{1}{2}$

$\frac{1}{6}$ 619
$\frac{1}{4}$ 154-9

77 || 3-9

38-13-9 *facit.*

417 at 2 *d.* $\frac{3}{4}$

$\frac{1}{6}$ 69—6
$\frac{1}{4}$ 17—4—$\frac{1}{2}$
$\frac{1}{2}$ 8—8—$\frac{1}{4}$

9 || 5—6—$\frac{3}{4}$

4-15-6 $\frac{3}{4}$ *facit.*

3716 at 3*d.* $\frac{1}{4}$

$\frac{1}{4}$ 929
$\frac{1}{12}$ 77--5

100 || 6—5

50-6-5 *facit*
lb

41712 at 3*d.* $\frac{1}{2}$

$\frac{1}{4}$ 10428
$\frac{1}{6}$ 1738

1216 || 6

608-6-0 *facit.*

817 at 3*d.* $\frac{3}{4}$

$\frac{1}{4}$ 204—3 *d.*
$\frac{1}{4}$ 51—0 $\frac{3}{4}$

25 || 5-3 $\frac{3}{4}$

12-15-3 $\frac{3}{4}$ *fac.*

7138

7138 at 4 *d* $\frac{1}{4}$

$\frac{1}{6}$ 1189—8
1189—8
$\frac{1}{8}$ 148—8 $\frac{1}{2}$

252||8—0 $\frac{1}{2}$

1268—0 $\frac{1}{2}$ *fac.*

517 at 4*d.* $\frac{1}{8}$

$\frac{1}{3}$ 1723—8
$\frac{1}{8}$ 215—5 $\frac{1}{2}$

193||9—1 $\frac{1}{2}$
96-19-1 $\frac{1}{2}$ *fac.*

971 at 4 *d.* $\frac{3}{4}$

$\frac{1}{3}$ 323—8
$\frac{1}{8}$ 40—5—$\frac{1}{2}$
$\frac{1}{2}$ 20—2—$\frac{3}{4}$

38||4—4 $\frac{1}{4}$

19-14-4 $\frac{2}{3}$ *facit.*

712 at 5 *d.*

$\frac{1}{3}$ 237—4
$\frac{1}{8}$ 59—4

29||6—8

14-16 8 *facit.*

3716 at 7 *d.*

$\frac{1}{2}$ 1858
$\frac{1}{6}$ 309—8

216||7-8

108-7-8 *facit.*
8716 at 8 *d.*

$\frac{1}{3}$ 2905—4
2905—4

581||0—8

290-10-8 *fac*

371 at 9 *d.*

3185—6
1592—9

77||8—3
238-18-3 *facit.*

846 at 10 *d.*

423
211—6

70—6

70||5—0

35-5—0 *facit.*

687 at 11 *d.*

2343—6
1562—4
390—7

429||6—5

214-16-5 *facit*

$\frac{1}{2}$
$\frac{1}{4}$
$\frac{1}{4}$

2716 at 12 *d.*

271||6

135 *l.* 16 *s.* *facit.*

3762 at 12 *d.* $\frac{1}{4}$

1881
940—6
9406—6
78—4 $\frac{1}{2}$

384||0—4 $\frac{1}{2}$

192-0—4 $\frac{1}{2}$ *facit.*

5627 Ells at 13 *d.* *per* Ell.

IV. As for the 12*d.* that is done to your hand, there being ſo many Shillings as there are Ells: then for the Penny, conſider tha at 12 *d.* *per* Ell it comes to ſo much, & fo the odd penny take $\frac{1}{12}$ of the given ſum which will make likewiſe Shillings, An thus you may do touching any of the following Queſtions, taking the even or uneven parts, as you have learned before.

2684 at 13 *d.*

2684
$\frac{1}{12}$ 223--7

290-7--7

l., *s.* *d.*
145-7---7 *facit.*

8642 at 14 *d.*

8642
$\frac{1}{8}$ 1440—4

1008‖2-4
$\frac{1}{2}$
504-2-4 *facit.*

7684 at 15 *d.*

7684
$\frac{1}{4}$ 1921

960‖5

480-5 *facit.*

3716 at 16

3716
$\frac{1}{3}$ 1238 at 8

495‖4—8

247-14-8

3141 at 17 *d.*

1236 at 18 *d.*

26812 at 19 *d.*

1213 at 20 *d.*

417 at 21 *d.*

1021 at 22 *d.*

317 at 23 *d.*

1712 at 2 *s.*

V. Obſerve that as many yards as there e, ſo many two ſhillings; therefore ltiply by 2, and the Product will be llings: and this method you may obve in all others.

Or this, if you will.

For thoſe even Parts of a pound that are ſt familiarly known, as two Shillings, may take the $\frac{1}{10}$ for two Shillings & ence the $\frac{1}{8}$ for three Shillings and four ce, the $\frac{1}{6}$ for 4 Shillings the $\frac{1}{5}$ for 5 llings the $\frac{1}{4}$ for 6 Shillings & 8 pence $\frac{1}{3}$, for 10 Shillings the $\frac{1}{2}$.

℔

1712 at 2 *s. per* ℔

2

342||4

171 *l.*—4 *s. facit.*

Ells.

7260 at 2 *s.* 1 *d.*

2

$\frac{1}{12}$ 14520

605

1512||5

$\frac{1}{2}$ 756-5 *s. facit.*

412 at 2 *s.* 3 *d.*

106 at 2 *s* 4 *d.*

171 at 2 *s.* 5 *d.*

3672 at 2 *s.* 2*d.*

2

$\frac{1}{6}$ 7344

612

795||6

397*l.* 16*s. facit.*

If Pence be required in the *Queſtion*, the Parts fo Pence take out o the given Sum, a in theſe three la Examples do appear.

1410 at 2 *s.* 6 *d.*

712 at 2 *s.* 7 *d.*

100 at 2*s.* 8*d.*

6101 at 2 *s.* 9 *d.*	6109 at 2 *s.* 11 *d.*
1006 at 2 *s.* 10 *d.*	

4672 Ells and $\frac{1}{2}$ at 4 *s.* and 4 *d.* *per* Ell. Queſtions of this nature that do conſiſt f ſeveral Denominations, as $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{5}$, *&c.* re wrought as before, only for the half Ell, ke half of the given Price of an Ell, *&c.* r a quarter, take a quarter of the Price, c. and add it to the former Sum.

Example.

Ells.
4672 $\frac{1}{2}$ at 4 *s.* 4 *d.*
4 2 2

18688
1557—4 *d.*
2—2

2024||7—6

1012-7—6 *facit.*

C. s. d.
17 $\frac{1}{4}$ at 17-7 *per* C.
17

119—4—4 $\frac{3}{4}$
17
$\frac{1}{2}$ 8—6
$\frac{1}{6}$ 1—5
4—4 $\frac{3}{4}$

30||2—3 $\frac{3}{4}$

15-3—3 $\frac{3}{4}$

VII. If the Price required be concerning Pounds neat, you muſt reduce the Hundreds groſs into Pounds groſs, and ſubtract the Pounds tare from them, and the Remains will be Pounds neat.

32 C. groſs tare 172 lb at 7 *d. per* lb neat.

32
112

64
32
32

3584 lb. groſs.
172 lb tare.

3412 lb. neat.
lb *d.*
3412 at 7 *per* lb.

1/2 1706
1/6 284—4 *d.*

[illegible]99||0---4 *d.*

99·10·4 *facit.*

36 C. groſs, tare 94 lb. at 14*d. per* lb. neat.

36
112

72
36
36

4032 lb groſs.
94 lb tare.

3938 lb. neat.
lb. *d.*
3938 at 14 *per* lb

1/6 3938
656---4 *d.*

459||[illegible]---4 *d.*

229·14·4 *facit.*

VIII Again, obſerve whether the Pounds Tare be abſolutely ſo much as in the laſt Example, or whether it be ſo much *per* Bag, *per* C. or Barrel, *&c.* If it be any of theſe, multiply the Tare given by the C. Bag, or Barrel, & the Product will be Pounds Tare, which ſubtract from the Pounds groſs, and the Remains are Pounds neat.

Exmaple.

56 C. groſs, Tare 17 ℔ *per* C. at 9*d* *per* ℔ neat.

56	56
112	17
112	392
56	56
56	952

6272 ℔ grois.
952 ℔ tare.
5320 ℔ neat.

d.
5320 ℔ rt 9 *per* ℔.
2660
1330
399|0 $\frac{1}{2}$
199-10 *facit.*

12 C. groſs, Tare 13 ℔. *per* C. at 18 *d.* *per* ℔ neat.

12	12
112	13
24	36
12	12
12 pound tare	156

1344 ℔ groſs.
156 ℔ tore.
1188 ℔ neat.

d.
1188 at 18 *per* ℔.
1188
594
178||2
89-2-0 *facit.*

IX Obſerve whether the given Price required be ſo much *per* C. if ſo, ſubtract them from the C. groſs.

Example.

17 C. groſs, Tare
11 ℔ *per* C. at
15 *s. per* C. neat.

17
11

17
17

7 (5 C. *qr.* ℔.
187 (1--2--19 *ta:*
112

C. *qr.* ℔.
17 -0--0 *groſs.*
1--2--19 *tare.*

15--1--9 *neat.*

C. *qr.* ℔.
15--1--9 a: 15 *s. per C.*
15

75
15

225
3—9
1—2 $\frac{1}{4}$

22||9—11 $\frac{1}{4}$

1-9—11 $\frac{1}{4}$ *facit.*

20 C. groſs, Tar
13 ℔. *per* C. a
12 *s. per* C. neat.

20
13

60
20

260
(3 (C. *qr.* ℔.
260 (2—1—8 *t*
112

C. *qr.* ℔.
20--0--0 *groſs.*
-2-1-8-*tare.*

17--2--20 *neat.*

C. *qrs.* ℔.
17--2--20 at 12 *s.*
12

34
17

204
6
2—1 $\frac{1}{2}$

21—2—1 *d.* $\frac{1}{2}$

10-12--1 *d.* $\frac{1}{2}$ *f*

X

X. I think thoſe former Rules well ob-
erved, to be ſufficient for your Inſtructi-
n touching Tare, only if the groſs Hun-
reds have ſeveral Species, as ¼, ½, ¾ odd
Pounds, or the like, then conſider, if one
C. give ſo much Tare, then a quarter of
C. will give a quarter ſo much; and if
ne quarter give ſo much, 14 Pound will
ive half ſo much; & if 14 Pound give
o much, then 7 Pound will give half as
nuch, *&c.*

Example.

13 C. ½ groſs, Tare
12 ℔. *per* C. at 2 *s.*
3 *d.* *per* ℔. neat.

96 C. 14 ℔. groſs,
Tare 13 ℔. *per* C.
at 3 *s.* 6 *d.* *per* ℔. neat.

What Tret is.

XI Having thus ſhew'd you the Way
f finding out the Tare, I come in the
ext place to ſhow you how to find out
he Tret, which is a certain Allowance of
℔. *per* 104 ℔. upon many ſorts of
ommodities.

Example.

39 C. groſs Tare 15 ℔. *per* C. and 4 ℔.
r 104 ℔. Tret, at 4 *s.* 6*d.* *per* ℔. neat.

1. Bring the C. groſs into Pounds groſ

2. Multiply the ℔. tare by the C. groſ and the Product is the Pounds tare.

3. Subtract the ℔ tare from the ℔ groſ and the remain is ſubtil Pounds, whic Pounds divide by 26, becauſe 26 is contai ed 4 times in 104, and as often as it i contained; ſo many Pounds Tret there ar which ſubtract from the ſubtil Pounds, an the remain will be neat Pounds.

C	
39	39
113	15
78	195
39	39
39	585 ℔ *tare.*
4368 ℔. *groſs.*	(1
585 ℔ *tare.*	$\cancel{1}14$ ℔.
3783 ℔ *ſubtil.*	$\cancel{3}7^{3}$ (3 (145 *tr*
145 ℔ *tret.*	$\cancel{2}6\cancel{6}6$
3638 ℔. *neat.*	$\cancel{2}\cancel{2}$

At 4 *s.* 6 *d. per* ℔. *facit* 81 *l.* 1 *s.*

Oth

Other ways there are to find out the Tare, but I conceive theſe are the moſt plain for young Learners: However I ſhall give them one or two Examples of another manner of working, which is both very commendable and ſpeedy.

1. When the Tare is 14 Pound *per Cent.* take the $\frac{1}{8}$ part of the Pounds groſs, & the Quotient will be Pounds Tare.

2. When the allowance is Tare 16 *l. per Cent.* take the $\frac{1}{7}$ part, or divide it by 7, and the Quotient will be Pounds Tare.

3. Suppoſe it were Tare 24 Pounds *per Cent.* work firſt for 16 as before, then take the $\frac{1}{2}$ of that which 16 cometh to, for if 16 produce ſo much, 8 muſt produce the $\frac{1}{2}$ of that, which being added will make the Pounds tare for 24 Pounds *per Cent.*

Again, ſuppoſe it were at 20 Pound *per Cent.* you may work firſt for 16, & then 4 will be the $\frac{1}{4}$ of that Quotient, which being added maketh the Total of your Pounds Tare for 20 Pound *per Cent.*

Again, ſuppoſe it were for 12 Pound *per Cent.* Tare, work as before for 16, which Quotient is for 4 too much, therefore take the $\frac{1}{4}$ of that, & ſubtract from that of 16, and the remains will be Pounds Tare, or 12 Pound *per Cent.*

Again, ſupoſe it were 7 Pounds *per Cen* Tare, work for 14, and if 14 comes t ſo much, then 7 will be ½ of that. And yo may with Eaſe work all Queſtions of thi kind; by making 14 or 16 your ſtandin Rule, adding and Subtracting the Part o Parts of it more or leſs, as occaſion require I might ſay more as to this, but ſhall forbear, only I will give you two or thre Examples ready caſt up, and ſtate a fe others to exerciſe your Ingenuity therewit

48 C. Groſe. Tare 14 lb. *per Cent.* a 10 *d.* ½ *per* lb. neat.

C.
48 4704 lb at 10 *d.* ½ *per* lb
112

56
48
48

5376 lb. *groſs.*
⅛ 672 lb. *tare.*

4704 lb. *neat.*

56 C. $\frac{1}{4}$ groſs, Tare 16 Pound *per Cent.* at 9 *d.* *per* Pound neat

C.
56 $\frac{1}{4}$
4

225
28

1800
450

6300 lb. groſs.
900 lb tare.

5400 lb. neat. at 9 *d*

2700
1350

405||0

202-10--0 *facit.*

97 C. $\frac{3}{4}$ 11 lb groſs, Tare 24 lb. *per Cent.* at 5 *d.* *per* lb. neat.

97 $\frac{3}{4}$ 11
4

391
28

3129
783

10959 lb groſs.

$\frac{1}{7}$ 1565
$\frac{1}{2}$ 782

2347 lb. tare.

8612 lb. neat 5 *d.*

$\frac{1}{3}$ 2870—8
$\frac{1}{4}$ 717—8

358||8—4

179·8—4 *facit.*

19 C. ¼ 11 Pound groſs, Tare 18 Pound *per Cent* at 7 *d.* ½ *per* ℔. neat.

20 C. ½ 13 Pound groſs, Tare 12 Pound *per Cent.* at 10 *d.* *per* Pound neat.

34 C ¼ 19 Pound groſs, Tare 7 Pound *per Cent.* at 11 *d.* *per* ℔ neat.

86 C. ½ 13 Pound groſs, Tare 13 Pound *per Cent.* at 8 *d.* *per* ℔ neat.

13 C. ½ groſs, Tare 22Pound *per Cent.* at 16 *d.* *per* Pound neat.

19 C. ¼ 19 Pound groſs, Tare 19 ℔. *per Cent.* at 18 *d.* *per* ℔. neat.

CHAP. XVI.

The Double Rule of Three:

HAving ſomewhat at large inſiſted upon the two laſt Rules, *viz. The Rule of Three* and *Practice*, I come to the ſecond Rule of Proportion, commonly called, *The Double Rule of Three*, which hath its Denomination from its double working: And as I did in the former *Rule of Three* proceed with one plain and eaſie working of the ſame either *Direct* or *Indirect*: So I ſhall here alſo obſerve the ſame Order; but here firſt a diligent Heed muſt be had unto the ſtating of the Queſtion, becauſe under this Rule are comprehended divers Rules of *Plural Proportion.* Therefore obſerve as in the former *Rule* of *Three*, ſo in this.

1. That firſt and third Numbers be both of one Species, *viz.* if the firſt Number be Principal, the third muſt be Principal; if the firſt be Intereſt, the third muſt be Intereſt. If the firſt be Time, the third muſt be Time; if the firſt be Men, the third muſt be Men.

2. Obſerve that the two firſt Terms in the Queſtion do conſiſt of a Suppoſition, and the third Term of Demand.

Example.

If 100 *l.* in 12 Months gain 6 *l.* what ſhall 276 *l.* gain in 18 Months?

1. Here you ſee the Suppoſition is,
If 100 *l.* gain 6*l.*
2 The Demand is,
What will 276 *l.* gain?

100 *l.*——6 *l.*——276 *l.*
20 1440
———— ————
120 11040
12 1104
———— 276
1440 ————

Cut off the two firſt Figures, and the reſt are Pence, *viz.* 3974 *d.*

3974||40
————

Then ſay,

If 12 *Mon.*——3974*d.*——what 18 *Mon.*
facit 5961 *d.*

If 6 Clerks can write 45 Sheets of Paper in 5 Days, how many Clerks can write 300 Sheets in 13 Days after that Proportion?

Sheets. Clerks. Sheets

45 —— 6 —— 300

6

8

1800 (40 Clerks. 1800

455

4

Days. Clerks. Days

5 —— 40 —— 13 *

5

200

7 (5 Clerks.

200 (15 $\frac{1}{3}$ *facit.*

133

1

* *Obſerve here, and ſo in others, whether the Demand be more or leſs, and work as hath been taught.*

If the Carriage of 56 C. weight 100 Miles coſt 14 *l.* what will 13 C. coſt being carried 29 Miles, after that rate?

C *l.* C.

56 —— 14 —— 13

14

52

13

182

(1 (4

182 (3 *l.* 5 *s.*

56

If 100 Miles—3 *l.* 5 *s.*—29 Miles?

20 65

65 145

174

18||85

facit 18 *s.* $\frac{17}{20}$.

If 8 Taylors make four Suits of Cloaths in 10 Days, how many will make 15 Suits in 14 Days?

If 4 Suits——8 Taylors——15 Suits?

8

~~120~~ (30 *facit* 120

~~44~~

If 10 Days——30 Ta——14 Days?

30

~~2~~ (6

300 ~~300~~ (21 $\frac{3}{7}$

~~144~~

~~1~~

Of what Principal was 150 *l.* gained in 19 Months, when 100 *l.* in 12 Months gained 6 Pound?

facit 1578 *l.* $\frac{18}{19}$ *Principal.*

How long time was 900 *l.* a gaining 420 *l.* when 6 *l.* was gained of 100 *l.* in 12 Months.

facit 93 *months* $\frac{1}{3}$.

A Scrivener lent 700*l* at Intereſt the 22 of *October*, 1639, and upon the 9*th* of *Decem.* 1645. received for the Intereſt thereof 330 *l.* I demand at what Price *per Cent. per Annum* it was lent?

The Time is 6 Years.

1 *Month* 17 *Days.* *facit* 7 *l.* $\frac{16837}{15659}$

If I ſow 20 Buſhels of Peaſe, and they produce in one year 276 Buſhels, I demand how many Buſhels in 6 year, will 90 Buſhels produce after that Proportion?

facit 7452 *Buſhels.*

What is the Principal that gained 476 *l.* n 16 Months, when 100 in 12 Months ained 6 *l.*

5950 *l. Principal.*

In what time was 850*l.* gained of 40 Pounds, when 100 *l.* in 12 Months ains 6 Pounds?

facit 15 *Years*, 25 *da.* $\frac{21}{47}$

If 100 *l.* in 12 *mon.* gained 6*l.* what Money was that which gain'd me in 8Months Pounds?

facit 250 *l. Principal.*

If 4 *s.* 8 *d.* pay 1 Soldier for 1 Week, how many Dollars at 4 *s.* 2 *d.* will pay 80 Men for one Month ?

facit 358 Dollars $\frac{2}{5}$

An Uſurer lent the 11*th* of *July*, 1647, a Sum of Money at Intereſt for 6 *l.* *per Cent.* and on the 27 of *Feb.* 1651. received for Intereſt thereof 318 *l.* 12 *s.* I demand what was the Sum lent ?

The time between
the 11*th of* July, 47
to the 27*th of* Feb. 51.
is four Years, 7 *Mon.*
16 *Days.*

facit 1148 *l.* $\frac{326}{1688}$

If 10 Brick-layers make a Wall of 100 Foot long, and 20 foot high in 12 Days, how many Brick-layers will make a Wall of 236 foot long, and 20 foot high in 16 Days ?

facit 17 *Men* $\frac{7}{10}$

CHAP.

CHAP. XVII.

A moſt brief & compendious way of working all manner of Queſtions of Intereſt upon Intereſt:

Example.

FIrſt, State your Queſtion thus:

If 100 *l.* gain 6*l.* what the Principal?

2. Multiply the ſecond and third Numbers together, and divide by your firſt, which is done by cutting off the two firſt Figures of the Pounds with a Line.

3. Multiply them by 20, by 12, and 4, & all above 2 Figures in each Multiplication carry over the line to the left, as you ſee in theſe following Examples.

If 100 *l.* in 12 Months gain 6 *l.* what will 356 *l.* gain in 18 Months?

If 100 *l.*———6 *l*———356 *l.*

6

21||36

||20

7||20

||12

2||40

|| 4

1||60

	l.	*s.*	*d.*
12 *Mon. fa.*	21	07	2 $\frac{1}{4}$
6 *Mon. fa*	10	13	7
	32	00	9 $\frac{1}{4}$

275 *l.* let out for three years, 6 *l.* *pe* *Cent. per Annum.*

100———6———275

6

l. *s.* *d* 16||50

1 Year *facit* 16 - 10 - - 0 Then||20

3

3 Years will be } 10||00
3 times this Sum }

236 *l.* 10 *s.* 5 *d.* let out for 16 Months at 6 *l* *per Cent. per Annum.*

100 *l*———6———236——10—

Mon. *l.* *s* *d.* 14||19—02—

facit in 12—14--3—9 $\frac{3}{4}$ ||20

$\frac{1}{3}$ 4·14—7 $\frac{1}{4}$

——————3||82

Mo. 12

facit in 16——18——18——4——

9||90

||4

3||60

Th

The ſame Order obſerve for Intereſt upon Intereſt; only add the laſt Intereſt to the third Number of the laſt Queſtion, & work as before in theſe Examples following.

417*l.* 11*s.* 8*d* let out for four Years, at 6*l.* *per Cent. per Annum*, Intereſt upon Intereſt.

```
l.    l    l.    s.   d.
100—6—417—11—8
                       6
        ——————————————
           25|| 05:10:0
                   20
        ——————————————
            1||10
             ||12
        ——————————————
            1||20
             ||4
        ——————————————
             ||80
```

Facit 25 *l* 1 *s.* 1 *d.*

Multiply ſecond and third Numbers together, ſaying, 6 times 8 Pence is 48 Pence, which is 4 Shillings, ſet down 0 and carry 4 to the Shillings, ſaying 6 imes 16 is 46, and 4 that I carried is 70 Shillings; ſet down the 10 *s.* and carry 3 to the Pounds, ſaying, 6 times 7 is 42, and 3 that I carried is 45, ſet down 5, and carry 4, ſaying, 6 times 1 is 6, & 4 that I carried is 10, ſet down 0 & carry 1, ſaying 6 times 4 is 24, and 1 that I carried is 25, which ſet down, and cut off the two firſt Figures of the Pounds, & multiply as before, & the Product will be according to the Examples, 25 *l.* 2 *s.* 1 *d.* ſimple Intereſt for the firſt Year, the which add to your former Principal 417 *l.* 11 *s.* 8 *d.* and it will make 442 *l.* 12 *s.* 9 *d.* Then ſtate your Queſtion again, ſaying,

```
                               l.   s.  d.
    If  100 l.——6 l.——————442——12——9
                                       6
                          ——————————————
                          26||55——16——5
                            ||20
                          ——————————————
                          11||16
      l.   s.   d.  q.      ||12
Sec.Year 21--11--1--3     ——————
                           1||98
                            || 4
                          ——————
                           3||92
```

l. s.

Add this Intereſt unto the 442—12--0
and it will make——————469—03-10

Then ſtate your Queſtion again, & work as before, ſaying,

l. s. d.
100 *l* ——-6 *l.*——--469—3—-10 $\frac{3}{4}$
6

l. s. d. 28‖15—3—4 $\frac{1}{2}$
Third Year 28—3—0 $\frac{1}{4}$ ‖20

3‖03
‖12
0‖40
‖4

1‖62

Which 28 *l.* 3 *s.* 0 *d.* $\frac{1}{4}$ add unto the 469 *l.* 3 *s.* 10 *d.* $\frac{3}{4}$, *facit* 497 *l.* 6 *s.* 11 *d.* Then ſtate your Queſtion again, and work as before, ſaying,

l. s. d.
100 *l.*——6 *l.*——-497—6—-11
6

29‖84—1—6
‖20

16‖81
‖12

9‖78
‖4
3‖12

Which being added to the 497*l.* 6*s.* 11*d.* *facit* 527*l.* 3*s.* 8*d.* $\frac{3}{4}$ Intereſt upon Intereſt for 4 Years at 6 *l.* *per Cent. per Annum.*

And thus you may in a brief manner work all Queſtions of this nature. Other ways of working there are, of which I ſhall give you two or three Examples,and leave them to your Conſideration.

Example.

I demand how much the Intereſt of 819 *l.* will amount unto for 3 Years 7 Months, 18 Days after 6 *l. per Cent. per Annum*, Intereſt upon Intereſt?

```
If 100——106——819
                 20
              -----
              16380
                 12
             196560
                106
            -------
            1179360
            1965600
            -------
          208353(60 firſt Yea
                         10
```

106

1250118
2083530

220354(18 *ſecond Year.*
106

1325124
2208540

234105 (24 *third Year.*
106

1404630
2341050

248151 (30 *fourth Year, from*
234105 (*which ſubtract the third.*

14046 *one Year.*

7023 : 6 *Months.*
1170 : 1 *Month.*
585 : 15 *Days:*
117 : 3 *Days.*
234105 : *third Year.*

Facit 243000 *d.*

A Table to find out what any Sum of Money will amount to for 21 Years, or under, at 6 l. in the Hundred, Intereſt upon Intereſt.

	l.	s:	d.	q
1	1	01	02	1
2	1	02	05	2
3	1	03	09	3
4	1	05	03	0
5	1	06	09	0
6	1	08	04	1
7	1	10	00	3
8	1	11	10	2
9	1	13	09	1
10	1	15	09	3
11	1	17	11	2
12	2	00	02	3
13	2	02	07	3
14	2	05	02	2
15	2	07	11	0
16	2	10	09	2
17	2	13	10	0
18	2	17	00	3
19	3	00	05	3
20	3	04	01	2
21	3	07	11	2

The Table is ſo plain, that I ſuppoſe it needs very little Demonſtration; I ſhall therefore only give you one or two Examples.

As,

If you would know what 36 *l*, comes to Intereſt upon Intereſt fo 20 Years.

Look againſt Numbe 20 in the firſt Colum and you will find wha the Intereſt upon Intere of 1 *l*. comes to for th time. Then ſay, by t Rule of Three.

If 1 *l*.——3 *l*. 4 *s*. 1 *d*. ½——36 *l*?

I deſire to know how much 346 Pound will amount unto in 13 Years, Intereſt upon Intereſt, at 6 Pounds *per Cent.*

Look againſt Number 13 in the firſt Column, and you will find 2 *l.* 2 *s.* 7 *d.* 3 *q.*

Then ſay as before,

```
         l.   s.   d.   q.
If 1 be—2—2—7—3——346 l.
         20
         ——
         42
         12
         ——
         511
          4
         ——
         2047 q.
          346
         ——
         12282
         8188
         6141
         ——
         708262
2 2 (2       5966
08262       (17706 (5 (2475||5
44444      122222——————
             1111     737—15—5½ ſac.
```

A very brief and neceſſary Table to find out the preſent Worth of the Annuity *or yearly Rent for* 21 *Years or under, after the Rate of ſix* per Cent. per Annum.

	l.	s.	d.	qr.
1	0	18	10	2
2	1	16	08	0
3	2	13	05	2
4	3	09	03	2
5	4	04	02	3
6	4	18	04	0
7	5	11	07	3
8	6	04	02	2
9	6	16	00	2
10	7	07	02	2
11	7	17	09	0
12	8	07	08	0
13	8	17	00	2
14	9	05	11	0
15	9	14	02	3
16	10	02	01	1
17	10	09	06	2
18	10	16	06	1
19	11	03	01	3
20	11	09	04	3
21	11	15	03	1

For the underſtanding of this Table, the ſame Order is to be obſerved with the former As for Example.

If you would know what one Pound yearl Rent is worth for Years in ready Money.

Look againſt Num ber 7 in the firſt Co umn, and you will fin what 1 Pound is wort for ſeven Years, *vi* 5—11—7 $\frac{3}{4}$

Now to know wh any other *Annuity* (10 *l. &c.*) is worth he ſame time, ſay he Rule of Three.

l. *s.* *d.* *gr.*
If 1 *l.* be—5——11—7——3 what 40 *l.*
facit 223 *l*, 5 *s.* 10 *d.*

I have a Shop, a Place, or an Office, *&c.* worth 60 *l.* *per Annum* for 21 Years, and would ſell it for ready Money; the Queſtion is, how much it is worth?

Look againſt Number 21, and you will find 1 *l.* a Year is worth for that time 11 *l.* 15 *s.* 3 *d.* 1 *q.* Then ſay,

If 1 *l.* be worth 11 *l.* 15 *s.* 3 *d.* $\frac{1}{4}$, what ſhall 60 *l.* be?

facit 705 *l.* 16 *s.* 3 *d.*

What is 10 *l.* *per Annum* worth in ready Money for 4 Years and $\frac{1}{2}$ to come, at 6 *l.* *per Cent.*

facit 38 *l.* 7 *s.* 7 *d.* $\frac{1}{4}$.

Firſt, ſee the Table what 1 *l.* is worth for 4 Years.

facit 3 *l.* 9 *s.* 3*d.* $\frac{1}{2}$.

Then ſay, if 1 *l.* be worth 3 *l.* 9 *s.* 3*d.* $\frac{1}{2}$, what ſhall 10 *l.* *facit* 34 *l.* 11 *s.* 11*d.*

Now to find what the ½ Year is worth, ſee in the Table what 1 *l.* is worth for 5 Years. *facit* 4 *l.* 4 *s.* 2 *d.* ¾

Then ſay, If 1 *l.* be--4 *l.* 4*s.* 2*d.* 3*q.*—10

From which ſubtract the 4th Year, and the Remains will be for 1 Year, then take the ½ of it, which will ſhew what the ½ Year is worth.

5 *Years* 42*l.* 2*s.* 3*d.* ½

4 *Years* 34*l.* 12*s.* 11*d.*

1 *Year* 7 *l.* 9*s.* 4 *d.* ½

½ *Year* 3 *l.* 14 *s.* 8*d.* ¼

facit 3 *l.* 14 *s.* 8 *d.* ¼.

Which added to the *Facit* of the fourth Year, and it maketh 38 *l.* 7 *s.* 7 *d.* ¼.

CHAP. XVIII.

The Rule of Fellowſhip without Time.

1. IN the working of this Rule there is no difference betwixt it and the Rule of Three, where every Man's particular Stock being added together, the Total muſt be the firſt Number in the Rule of Three, the Gains the ſecond, and every Man's particular Stock the third.

Th

The Uſe of this Rule is therefore to give to each Partner his juſt and equal Share.

Obſerve then;

I. *As the whole Stock is to the whole Gain ſo is every Man's particular Stock to every Man's particular Gain.*

Example.

Two Merchants Company: *A* put in 20 *l.* *B* put in 40 *l.* and they gained 50 *l.* I demand each Man's Part of the Gains?

A——20 *l.*
B——40 *l.*

If 60 *l.* gain 50 *l.* what will 20 *l.*
facit 16 *l.* 13 *s.* 4 *d.* *A.*

If 60 *l.* gain 50 *l.* what will 40 *l.*?
facit 33 *l.* 6 *s.* 8 *d.* *B.*

50—0—0

If both the Shares added together make up the whole Gains, then is the Work right.

Three Framers hired a Shepherd to keep their Sheep for 7 *l.* 10 *s. per Annum.*

The firſt committed 430 Sheep to his care, the ſecond 357, and the third 500 Sheep: I demand how much each Man muſt pay of this 7 *l.* 10 *s.*

	l.	*s.*	*d.*
A muſt pay	2	10	1 $\frac{513}{1287}$
B muſt pay	2	01	7 $\frac{387}{87}$
C muſt pay	2	18	3 $\frac{387}{1287}$
Proof	7	10	0

Four Merchants ventur'd to Sea a Stock of 2475 *l.* whereof *A* put in 710 *l.* *B.* put in 960 *l.* *C* put in 207 *l.* *D* put in 598 *l.* & they gained 2000 *l.* But Tempeſtuouſneſs of Weather ariſing, were forced to caſt over-board as many Goods as amounted to 769 *l.* I demand what each Man muſt bear of this Loſs?

	l.
A muſt bear	220 $\frac{1490}{2475}$
B———	298 $\frac{690}{2475}$
C———	64 $\frac{583}{2475}$
D———	185 $\frac{1987}{2475}$
facit	769

Four Grocers laid in a Stock containing theſe ſeveral Sums following: *A* put in 120 *l.* *B* put in 136 *l.* *C* put in 180 *l.* *D* put 210 *l.* and with it they bought a Parcel of Fruit, by which they gained 398 *l.* I demand each Man's Part of the Gains?

l.

Anſwer { *A* ——— $73\frac{602}{646}$ 602
B ——— $83\frac{510}{646}$ 510
C ——— $110\frac{580}{646}$ 580
E ——— $129\frac{246}{646}$ 246

398 1938 (3
646

Three Merchants made a Company, *A* put in a certain Sum of Money, *B* put in as oftentimes 5 *l.* as *A* put in 4 *l.* *C* put in as oftentimes 7 *l.* as *B* put in 6 *l.* and they have gained together a certain Sum of Money, whereof *A*'s part is 100 *l.* I demand *B* and *C*'s Part, and the whole Gains?

4——100——5 *facit* 125 *B.*
6——125——7 *facit* $145\frac{5}{6}$ *C.*
facit 100 *A.*

$370\frac{5}{6}$

Two Merchants made a Company, *A* put in 350 *l*, and they gained togethe 196 *l* which *B* muſt have ſo oftentime 10 *l*. as *A* muſt have 6 *l*. I demand how much Money *B* put into the Company?

Always obſerve that every Man muſ have according as he hath put in: Then conſider.

If 6 ——— 350 ——— 10?

facit 583 *l*. $\frac{1}{3}$ *B* put in.

Two Men company & make a Stock o 700 *l*. whereof *A* put in 300 *l*. and the gained together 240 *l*. I demand what eac Man muſt have of the Gains?

facit 102—17—01 $\frac{5}{7}$ *A*
facit 137—02—10 $\frac{2}{7}$

240—00—00

Three Merchants made a Company: put in 600 *l*. *B* put in ſo oftentimes 50 as *A* put in 40 *s*. *C* put in ſo oftentim 70 *s*. as *B* put in 60 *s*. and they gained t

geth

gether 500 *l.* I demand what each Man put in, and muſt have of the Gains?

In Queſtions of this Nature, the particular Stocks unmentioned; muſt be found out by that which is mentioned.

As for Example, to find what Stock *B* put in

l.
If———4———600———7?
facit 750 *l.* *B.*

Such Relation as 6 hath to the Money which *B.* put in, ſuch Relation muſt 7 have to the Money which *C* put in: As,

l.
If———6———750———7?
facit 875 *l.* *C.*

600 *A*
750 *B.*
875 *C.*
———
2225.

l.
1} 2225———500———600 *A.*
2} 2225———500———750 *B.*
3} 2225———500———875 *C.*
———
2225.

Three Merchants made a Company, *D* put in 473 *l.* *E* put in 211 *l.* and they have gained together 562 *l.* whereo *F* muſt have 187 *l.* 15 *s.* I demand *D* and *E*'s Part, and what *F* put into Company?

To find what *F* put in, firſt ſubtract his Particular from the whole Gain.

l. — *s.*
562——-00
187——-15

374——-05

Then add *D* and *E*'s Stock together.

437 *D.*
211 *E.*

648

Gain. — *Stock.* — *Gain.*
374 *l.* 5 *s.*——648———187 *l.* 15 *s.*
facit 325 *l.*

Then to find *D* & *E*'s Part of the Profit

Stock. — *l.* — *s.* — *Stock.*
648——374—-5——437 *D.*
648——374——5——211 *E.*

Fello

Fellowſhip with Time.

III. The Uſe of this Part is the ſame with the former, and differeth not in Operation, ſave in this that every Man's Stock is multiplied by his time, and the Total of thoſe Products added together is he firſt Number, the Gain or Loſs the ſecond Number, and every Man's particular Stock and time the third.

Obſerve then,

IV. *As the whole Stock and Time is to the whole Loſs or Gain:*

So is every Man's particular Stock & Time o every Man's particular Loſs or Gain?

Example.

Two Merchants Company, *D* put in 100 *l.* for 4 Months, *E.* put in 136 *l.* for 3 Months, and they gained 50 *l.* I demand ach Man's part of the Gain?

l. *Mon.*
D put in 100 4——400
E. put in 136 3——408

808

808

l.

808——50 *l.*——400 *facit* 24

808——50 *l.*——408 *facit* 25

50

Three Butchers hired a piece of Groun for 12 *l.* 10 *s.* 6 *d.* *A* put in 20 Oxen Days; *B* put in 16 Oxen 7 Days; C pu in 25 Oxen 4 Days. I demand how muc each Butcher ought to pay for his Proportion?

		Ox.	*Days.*	
A	put in	20	5	100
B		16	7	112
C		25	4	100
				312

l. *s.* *d.*

312——12—10—6——100
facit 4—0—3 ,

312——12—10—6——112
facit 4--9-11,

312——11—10————100
facit 4--0--3 ,

l. *s.* *d.*
A 4——0——3 ,2$\frac{6}{7}$
B 4——9—11 ,1$\frac{1}{7}$
C 4——0——3 ,2$\frac{6}{7}$

Proof 12——10————6 $\frac{x3}{x3}$ (1

Three Merchants Company, *A* put in the firſt of *January*, 120 *l.* until *March* the 22*d.* *B* put in 176 *l.* the 10*th* of *Feb.* until the 12*th* of *April.* *C* put in 295 *l.* the 2*d* of *Feb.* until the 25*th* of *April*, and they gained 800 *l.* I demand each Man's Part of the Gains?

l.
A muſt have 174 $\frac{7596}{44646}$
B muſt have 192 $\frac{16768}{44646}$
C muſt have 433 $\frac{20282}{44646}$

Proof 800.

$\frac{\cancel{44646}}{\cancel{44646}}$ (1

Three Merchants Company for 18 Months, *D* put in 500*l*, and at 5 Months took out 200*l.* & at 10 Months put in more 300*l* & at 14 Months took out 130*l.* *E* put in 400*l.* & at 3 Months put in more 270*l.* & at 9 Months took out 100*l.* and at 12 Months put in more 100*l.* & at 15 Months took out 99*l.* *F* put in 900*l.* and at 6 Months took out 200*l.* and at 11 Months put in 500*l.* and at 13 Months took out 600*l.* and they gained 200*l.* I demand each Man's Part of the Gains?

l.
D muſt have 50 $\frac{12356}{32873}$
E muſt have 62 $\frac{20447}{32873}$
F muſt have 87 $\frac{9}{32873}$

Proof 200 $\frac{32873}{32873}$ (1

Two Men made a Stock of 165*l.* wherewith they gained 28*l.* which added to the Stock makes 193*l.* *D*'s Money was in 12 Months, and *E*'s Money was in but 8 Mo. When they ſhared the Stock and Gain, *D* had 67 *l.* and *E.* 126. I demand what was each Man's Stock?

State your Queſtion thus:

As 12 *mo.* to 165 *l.* ſo is 8 *mo.* to 110 *l.* for *E*'s Stock, the which ſubtract from 165, & the Remainder will be 55*l.* for *D*'s Stock.

The Proof.

If 55 *l.* in 12 *mo.* gain 12 *l.* what 110 *l.* in 8 *Months*? *Gains.*

55 *l.*——12 *l.*——110 *l.* *facit E* 16 *l.*
m. 12 8 *mo.* *facit D* 12 *l.*

Or,

Having the Stock, you have the Gains by ſubtracting each Man's Stock from his Stock, nd Gain given, without the *Rule of Three.*

Stock and Gain of *D.*——67 *l*
Stock of *D*————55
D's Gain——12

Stock and Gain of E——126
Stock of *E*————110
E's Gain——16 9

So that *D* with 55 *l.* Stock gains 12 *l.* *E* ith 110 *l.* gains 16 *l.*

12
28

CHAP. XIX.

Of BARTER.

BArter is the exchanging Wares for Wares, or one Commodity for another.

Example.

Two Merchants barter: *A* hath 3 C ½ of Pepper at 13 *d.* ½ *per* Pound; *B* hath Ginger at 15 *d.* ¾ *per* Pound. I demand how much Ginger muſt be delivered for the Pepper?

1. See what the Pepper is worth, ſaying, If 1 lb. coſt 13 *d.* ½, what coſt 3 *C* ½?

facit 22 *l.* 1 *s.*

2. Say; if 15 *d.* ¾ buy 1 lb. of Ginger, what will 22 *l.* 1 *s.* buy?

facit 347 ¼ *Ginger.*

Two Men barter: *A* hath 20 Ells of Cloth at 9 *s.* 6 *d.* *per* Ell ready Money, but in Barter he will have 10 *s.* 2 *d.* *per* Ell: *B* hath *Jerſey* Wool at 2 *s.* 10 *d.* *per* Pound: I demand how much Wool muſt be delivered for the Cloth Barter?

A

As before, ſo here:

If 1 Ell in Barter be 10 *s.* 2 *d.* what 20 Ells in Barter. *facit* 2440 *d.*

If 34 *d.* buy 1 lb. what will 2440*d.* buy? *facit* 71 lb. $\frac{13}{17}$

Two Drapers barter, the one hath 472 Yards of Canvas at 16 *d.* *per* Yard, the other lets him have 38 Pieces of Cloth: The Queſton is, How much one Cloth ſtands him in?

facit 16 *s.* [illegible]

20 Bags of Hops, each 3 C. $\frac{1}{2}$ bartered for 336 C. of Brazil, at 18*s.* a C. I demand what Price were the Hops ſold at?

Anſwer 4 *l.* 6 *s.* $\frac{14}{35}$ *per* C.

A Merchant hath Tobacco, which he will barter at 14 *d.* *per* lb. for Sugar at 10 *d.* *per* Pound in Barter. I demand how much Tobacco muſt be given for 8900 lb. of Sugar?

Anſwer 6357 lb. $\frac{1}{7}$

Nutmegs at 4 *s.* 2 *d. per* ℔. ready Money, 5 *s.* in Barter, how muſt Pepper at 12 *d. per* ℔. be ſold to make the like Profit?

Anſwer 14 *d.*

How many Dozen of Candles at 5 *s.* 2 *d. per* Dozen muſt be given for 3 C. 2 Qrs 16 ℔ of Tallow at 37 *s.* 4 *d. per* C?

Anſwer 26 *Dozen*

A Merchant hath Stockings at 39 *s. per* Dozen ready Money, which he will barter at 46 *s. per* Dozen for Canvas, at 13 *d. per* Ell ready Money. I demand what Price the Canvas muſt bear in Barter, to gain 5 *l.* in the 100 *l.*

Anſwer 16 *d.* $\frac{1}{2}$ *and* $\frac{57}{136}$ of $\frac{1}{2}$ *d.*

Broad Cloth of 6 *s.* 8 *d.* the Yard ready Money, is bartered for 7 *s.* 9 *d.* for Wool at 10 *d. per* ℔. ready Money: What Price muſt be made of the Wool in Barter, to gain 11 *l. per Cent.*

Anſwer 12 *d.* 7

D hath Holland of 5 *s. per* Ell ready Money, bartered at 6 *s. per* Ell to *E*, for Broad Cloth at 9 *s.* 6 *d. per* Yard, which

co

ſt but 8 *s*. I demand which gaineth oſt, and how much *per Cent*.

Anſwer, D gains 20 *l*. *per Ceut*.
E 18 *l*. 15 *s*. *per Cent*.

CHAP. XX.

Of *EQUATION*.

THE Rule of *Equation* of Payments teacheth to reduce the times of ſe- ral particular Payments to one time for e Payment of the whole Sum.

Example.

If the Queſtion be of this Nature. A Merchant oweth 500 *l* to be paid at ayments, *viz.* 300 *l.* at 4 Months, 100 *l.* 6 Months, & 100 *l.* at 12 Months. The btor agrees to diſcharge the whole Debt one Payment. Now the Queſtion is, at at time the Payment ought to be made, hout Damage unto the Debtor or Creditor,

tor, accounting 6 *l.* *per Cent. per Ann* Intereſt.

The Rule is this,

II. Multiply each particular Payme by its Time; then add all the Produ together, and divide the Total by t whole Debt.

l. *Mo.*
300 multiplied by 4 *facit* 12
100 multiplied by 6 *facit* 6
100 multiplied by 12 *facit* 12

Diviſor 500 *Dividend* 3

3000 (1
500

So that the Anſwer to the Queſt (according to this Rule) is, that Months is the Time for the Payment the whole Sum.

III. *For the Proof of this Rule, thus:*

300 *l.* ought to be paid at 4 Months, & not paid till 6 Months, that is 2 Months er its time. The Intereſt of 300 *l.* for Months is 3 *l.*

Then 100 *l.* paid at 6 Months, is the me equated.

The other 100 *l.* to be paid at 12 onths, is paid 6 Months before its ne; and the Intereſt thereof for 6 onths, is likewiſe 3 Pound.

Which ſheweth the Rule to be true, d at 6 Months is the time for the payent of the whole Sum, and thereby neier the Debtor nor Creditor is damaged ording to the Law.

A Merchant oweth 450 *l.* to be paid at payments, $\frac{1}{3}$ at 3 Months $\frac{1}{3}$ at 5 Months, d $\frac{1}{3}$ at 8 Months, and the Debtor and editor agree, that the whole Sum ſhall paid at one time: The Queſtion is, at Time ought the whole Sum to be d in; ſo that neither the one nor the er may be damnified.

The Rule is to multiply each Part by its Time, thus:

3

$\frac{1}{3}$ by $\frac{3}{1}$ *facit* 1 *Mon*

3
5

$\frac{1}{3}$ by $\frac{5}{1}$ *facit* 1 *Mon.* $\frac{2}{3}$

3
8

$\frac{1}{3}$ by $\frac{8}{1}$ *facit* 2 *Mon.* $\frac{2}{3}$

3

facit 5 *Mon.* $\frac{1}{3}$

A Merchant oweth 300 *l.* to be pai at 3 Months, $\frac{1}{3}$ at 6 Months, and $\frac{1}{3}$ at Months. I demand at what time the Sum ought to be paid together.

3 Mo.

by $\frac{3}{1}$ *facit* 1

3
6

by $\frac{6}{1}$ *facit* 2

3
12

by $\frac{12}{}$ *facit* 4

3

facit 7 *Mo.*

To prove the Certainty of this manner of Operation, you may take the ſame Courſe as before, 7 Months being the time for the Payment of the whole Sum.

See firſt what the Intereſt of theMoney omes to, that ſhould have been paid beore the 7 Months; and then ſee what the ntereſt of the Money comes to,that ſhould ave been paid after the 7 Months: And if he Intereſt of the one Part be equal with he Intereſt of the other,then is the former Operation right; and 7Months muſt needs e the juſt time. As for Example.

100*l.* ſhould have been paid at 3Months, ut now is not paid till 7 Months, ſo

A that

that the Intereſt for that 100 *l.* muſt b
accounted for the 4 Months delay, whic
Intereſt is————————2 *l.*——0

100 *l.* more ſhould have been paid at
Months, and now is delayed till 7 Month
The Intereſt for that is————0 *l.* —10

---

facit 2 *l.*——10

The other 100 *l.* is paid 5 Months be
fore its time, and the Intereſt thereof fo
5 Months is likewiſe————2 *l.*——10
equal with the former, which ſhews th
Operation to be right.

There is owing to a Merchant 349 *l.*
be paid 80 Pound ready Money, 100 *l.*
3 Months, and 160 *l.* at 8 Months. I d
mand what is the indifferent Time f
the payment of the whole?

IV. In Queſtions of this nature, ſet do
the particular Sums, and the ſeveral tim
of Payment, thus:

l.	*Mo.*
80	00,
100	03
160	08

Then multiply each Sum by its Ti
of Payment, and the Work will ſtand th

A

Add all the Products together, and divide the Total by the whole Debt.

$$\begin{array}{rcccl} l & & & & \textit{Mo.} \\ 8 & — & 0 & — & 00|0 \\ 10 & — & 0 & — & 30|0 \\ 16 & — & 0 & — & 128|0 \end{array}$$

34 *Diviſor.* 158 *Dividend.*

(2(2
~~1~~5~~8~~ 4 $\frac{11}{17}$ *facit.*
~~3~~4

There is 245 *l.* 10 *s.* 9 *d.* to be paid $\frac{1}{2}$ at 6 Months, $\frac{1}{3}$ at 8 Months, and the reſt at 12 Months. What is the indifferent time for the Payment of the whole Sum together?

This Rule is laid down in the firſt and cond Examples, Multiply each part by s Time.

$$\left.\right\} \text{by} \left\{\begin{matrix}6\\8\\12\end{matrix}\right\} \textit{facit} \left\{\begin{matrix}3\\2\frac{2}{3}\\2\end{matrix}\right.$$

The Certainty hereof is demonſtrated by the Proof of the third Example.

facit Mo. 7 $\frac{2}{3}$

A is indebted unto *B* 300 *l.* to be paid o *l.* at 4 Months, and 200 at 8 Months.

And *B* oweth unto *A* 500 *l.* to be paid a 10 months. It is agreed between them, A ſhall make preſent pay of his whole Deb and *B* ſhall pay his ſo much the ſooner, a ſhall countervail that favour : I demand a what time *B* muſt pay the 500 *l.* reckoning ſimple Intereſt ?

V. For the Reſolution of this, and th like Queſtions, firſt ſee by the forme Rule what time *A* ought to pay in hi whole Money.

Mo.

1|00 } at { 4 —— 4
2|00 }   { 8 —— 16

(2
20 ($6\frac{2}{3}$
3

Then ſay by the Rule of Three.

If 3 —— $6\frac{2}{3}$ —— 5
20 4 *Mo. facit.*
5

Which 4 Months is to be ſubtra from 10 Months, (the Time that *B* oug to have paid in his Money) and there maineth 6 Months.

Ob

Obſerve, For the Proof hereof, ſee firſt what the Intereſt of 300 *l.* comes to for 6 Months $\frac{2}{3}$.

Then ſee what the Intereſt of 500 *l.* comes to for 4 Months. If both the Sums be alike, then is the former Work true.

A Merchant hath a certain Sum of Money owing to him, to be paid at 7 Months; his Debtor doth agree to pay him half ready Money, and $\frac{1}{3}$ at 4 Months: I demand what time he muſt have to pay in the reſt, o that neither Party may have Advantage of the other, without reckoning Intereſt upon Intereſt?

VI. For the Reſolution whereof, it matters not what the Sum was; but you may work the ſame by any Number that will aſily admit of the Parts mentioned in the Queſtion. And for our preſent uſe, we ill imagine the Sum that was to be paid t 7 Months, 60 *l.*

Whereof $\frac{1}{2}$, that is 30 *l.* muſt be paid onteut.

And $\frac{1}{3}$ which is 20 *l.* muſt be paid at 4 Months. Then ſee what the Intereſt of heſe two Parts comes to, for the time in hich they were paid before they were ue.

$$\text{The Intreſt of}\left\{\begin{array}{c}\textit{l.}\\30\\20\end{array}\right\}\text{for}\left\{\begin{array}{c}\textit{Mo.}\\7\\3\end{array}\right\}\text{is}\left\{\begin{array}{c}\textit{s.}\\21\\06\end{array}\right.$$

facit 27 *s.*

Now that which remains for a full Reſolution of the Queſtion, is only this:

To find out how long time the remaining Part of the Sum, which (is 10 *l.* muſt be retained, that the Intreſt thereof may come to 27 *s.*

And that is done by the Rule of Three, thus,

The Intreſt of 10 *l.* for 1 Month is 1 *s.*

If 1 *s.*———1 *mo.*———27 *s.*

facit 27 *M*

Unto which add the 7 Months allowed at firſt——— } 07

facit 34 *M*

A Merchant hath owing him 500 *l.* to b paid him at 8 Months, and his Debtor dot agree to pay him 200 *l.* at 3 Months, o condition that he ſhall let him have the *r* for ſo much longer: The Queſtion is, whe he muſt pay the reſt with Intreſt upon I tereſt ?

As in the former Queſtion, ſo in this.

Firſt, ſee what the Intreſt of 200 *l.* comes to for 5 Months, paid before the time.

The Intreſt of 200 *l.* for 5 Months comes to 5 *l.*

Then by the Rule of Three ſee how many Months 300 *l.* muſt be let out, that ſo the Intreſt thereof may come to Five Pound.

facit $3\frac{1}{3}$ *Months.*

To which add the 8

facit $11\frac{1}{3}$

A Merchant hath owing to him 146 *l.* 10 *s.* and 9 *d.* to be paid $\frac{1}{3}$ content, $\frac{1}{4}$ at 3 Mon. $\frac{1}{5}$ at 5 Months, and the reſt at 7 Months; and his Debtor doth agree to pay him all at one Payment: I demand when that Payment muſt be made, that neither have Advantage of the other?

$$\begin{array}{ccccc} & & \textit{Mo.} & & \textit{Mo.} \\ \left.\begin{array}{c}\frac{1}{3}\\[4pt] \frac{1}{4}\\[4pt] \frac{1}{5}\\[4pt] \frac{13}{60}\end{array}\right\} & \text{at} & \left\{\begin{array}{c}0\\[4pt] 3\\[4pt] 5\\[4pt] 7\end{array}\right. & \begin{array}{c}\text{———}\\[4pt] \text{———}\\[4pt] \text{———}\\[4pt] \text{———}\end{array} & \begin{array}{l}0\\[4pt] 0\frac{3}{4}\\[4pt] 1\\[4pt] 1\frac{31}{60}\end{array} \end{array}$$

facit $3\frac{4}{15}$

A Merchant hath owing 243*l.* 19*s.* 11 *d* to be paid $\frac{1}{6}$ at 2 Months, $\frac{1}{3}$ at 3 Months, and the reſt at 6 Months, the Debtor dot agree to pay $\frac{1}{2}$ content, and the other hal at one Payment : I demand when th Payment muſt be made, that neither ma be damnified ?

Firſt, do according to the former Rule What is the indifferent time for the Payment of the whole Sum together ?

$$\left.\begin{array}{c}\frac{1}{6}\\\frac{1}{3}\\\frac{1}{2}\end{array}\right\}\text{at}\left\{\begin{array}{l}\textit{Mo.}\\2\text{———}0\,\frac{1}{3}\\3\text{———}1\\6\text{———}3\end{array}\right.\quad\textit{Mo.}$$

facit 4 $\frac{1}{3}$ *Mo.*

Now in regard that $\frac{1}{2}$ is paid in Months, and $\frac{1}{3}$ before its due, it isReaſo and according to Rule, that he ſhou have the other $\frac{1}{2}$ 4 Months $\frac{1}{2}$ longe which being added to the juſt time Payment.

facit 8 *Mo.*

CHA

CHAP. XXI.

The Rule of REBATE *or* DISCOUNT.

1. MErchants commonly vend their Commodities either for ready Money, or to be paid at a certain time or times appointed, at 3, 4, 6 12 Months, or the like: but it often happeneth to be very convenient both to the Buyer and Seller, that this Money be paid in before it be due.

A Merchant ſells Goods to the Value of 100 *l.* to another, to be paid at 12 Months, but the other is willing upon an After-agreement to pay preſent Money upon Rebate, after 6 *l. per Cent, per Annum,* ſimple Intereſt. I demand the Sum paid & rebated?

Obſerve, Before you lay down the manner of working, obſerve that in all Rebatements, there ought to be no more Money paid than would augment it ſelf to the Sum firſt due, if it were put forth to Intereſt, and this may alſo ſerve as a ſure Proof of this Rule.

How to ſtate the Queſtion.

1. Firſt, ſee what the Intereſt of 100 cometh to for the time demanded.

2. Add that Intreſt to the 100 *l.* whic muſt be the firſt Number in the Queſtion 100 *l.* the ſecond, and the Sum to be rebated the third.

Example.

l. *l.* *l.*
If 106——100——100
100
————
10000

(3
~~4~~6 (6
~~10000~~ $(94\frac{18}{53}$ *facit.*
~~1066~~
~~10~~

Which put fort
to Intreſt wou
become 100 *l.*

I demand how much the Rebate of 289 19 *s.* will amount unto for 6 Months, at 8 *l. per Cent. per Annum*, ſimple Intereſt

l. *s.*
104——100——289——19
20
————
5799
100
————
579900

```
   ( 1
  76 ( 0
 5992 ( 0
579900 ( 557||5
104444 ——————————
  1000 278—15—25/26
   11
```

	l.	s.	d.
Was to be paid	289	15	0
is to be paid	278	15	$\frac{25}{26}$
Is rebated	11	03	1

I demand the Rebate of 321 *l.* 18 *s.* for 11 Months after 6 *l. per Cent. per Annum* ſimple Intereſt?

To find the Intreſt of 100 *l.* for any Number of Months, you may take the Parts of 12 Months, as thus: If 6 *l.* be the Intereſt of 100 *l.* for 12 Mo. then 6 Mo. will be the $\frac{1}{2}$ of that; 3 Mon. the $\frac{1}{2}$ of that $\frac{1}{2}$, and 2 Mon. the $\frac{1}{3}$ of that for 6 Months.

Example.

Mo.	*l.*	*s.*
12	6	00
6	3	00
3	1	10
2	1	00
	5	10

105 *l.* 10 *s* —100 *l* —321 *l.* 18 *s.*

facit 305 *l.*—$\frac{25}{211}$

I demand the Diſcount of 378 *l.* for two 6 Months after 6 *l. per Cent. per Annum* ſimple Intereſt?

By two 6 Months is underſtood that the $\frac{1}{2}$ *of the Money is to be paid at 6 Months, & the other* $\frac{1}{2}$ *at 6 Months after that*

Mo. l.
12—6—378
6—3—189

l. *l.* *l.*
103——100——189
facit 183 *l.* $^{s}_{10}$

l. *l.* *l.*
106——100——189
facit 178 *l.*

I demand the Diſcount of 760 *l.* 16 for three 4 Months, after 6 Pound *per Cent. per Annum* ſimple Intereſt?

Mo. *l.* *l.* *s.*
12—— 6 $\frac{1}{3}$ 760—16

4——2 253—12
8——4 253—12
12——6 253—12

102——100——253—12
facit 248 *l.* $_{5}^{3}$ $_{1}^{2}$ *for the firſt* ment at 4 *Months.*

104 *l.*——100——253 *l.* 12 *s.*

facit 242 $\frac{11}{13}$ *for the ſecond Payment at* 8 *Mo.*

106 *l.*——100——253 *l.* 12 *s.*

facit 239*l.* $\frac{13}{53}$ *for the third Payment at* 12 *Mo.*

There are other ways for the working of Rebate; but I ſhall only inſtance one more after 6 *l. per Cent.* As,

Firſt, Multiply the Money and the Time.

Secondly, Divide that Product by 200, *and the Time, and the Quotient is the Sum to be paid upon Rebate.* *Example.*

What is the Rebate of 100*l.* for 12 Mo. after 6 *l. per Cent. per Annum.*

100
12

1200
(1(4
120(0(5 $\frac{140}{212}$ ‖ $\frac{70}{106}$ ‖ $\frac{35}{53}$
212

100 was to be paid.
5 $\frac{35}{53}$ is to be rebated.

l. 94 $\frac{18}{53}$ is to be paid.

And thus you may work any other Queſtion after 6 *per Cent.* &c.

But if the Rebate be after 8 *l. per Cent.* then let the Diviſor be 150 and the Time.

CHAP. XXII.

Of EXCHANGE.

1. THE whole Courſe of Exchange is no more than to pay Money in one Place and Country, and receive in another the like Value or Sum, with Conſideration of either Loſs or Gain.

I might give you a Catalogue of Foreign Coins, but it will be to little purpoſe, becauſe they are not currant money as our *Engliſh* is, but do riſe ſome times higher in Value, and ſometimes lower, according as the Exchange runs. I ſhall therefore give you ſome choice Queſtions, and ſo leave you to enlarge: as you ſee occaſion.

A Merchant delivred 340 *l*. *Sterling* at *London* to receive the ſame at *Amſterdam*, the Exchange at 34 *s*. 7 *d*. *Flemiſh*, the 20 *s*. *Sterling*. I demand the ſame in *Flemiſh* Money.

2 Conſider that firſt and third Numbers muſt be of one kind; if the firſt be *Sterlin* Money the third muſt be ſo too: If the firſ *Flemiſh*, the third muſt be *Flemiſh*.

s. Sterl. s. d. Flem. l. Sterl.
If 20 ———— 34—7 ——— 340
12 20
415 6800
6800
332000
2490
282200||0
½ 141100 d.
½ 1175||8—4 d.
facit 587-18-4

Or thus:

340 *l.*—at 34 *s.* 7 *d.*
34
1360
1020
170
28—4 *d.*
1175||8-4 *d.*
587-18-4 *facit.*

A Merchant receiv'd a Bill of Fxchange of 8000 Crowns at 5 *s.* $\frac{5}{7}$ *Sterl.* I demand the Sum in *Sterling* Money. Say,

If 1 be——5 *s.* $\frac{5}{7}$, what——8000 ?

facit 2285 *l.* 14 *s.* 3 *d.* $\frac{3}{7}$

A Merchant delivered 245 *l. Flem.* at *Middleborough*, to receive the ſame at *London*, the Exchange at 29 *s.* and 5 *d. Flem.* the 20 *s. Sterl.* I demand the Sum *Sterling* Money ?

If 29 *s.* 5 *d. Flem.* be 20 *s. Sterl.* what 245 *l. Flemiſh* ?

facit 166 *l.* 11 *s.* $\frac{257}{353}$

A Merchant of *London* receiveth a Bill of Exchange from *Paris* 460 *l. Sterling*, for the Value delivered there at 84 *d. Sterling*, the 60 *s. Tournois.* I demand how much was delivered at *Paris Tournois*, when 20 *s.* make one Pound *Tournois* ?

84 *d.*——60 *s.*——460 *l.*

facit 394 *l.* 17 *s.* $\frac{1}{7}$ *Tournois.*

A Merchant at *London* delivered 80 *l. Sterling* by Exchange for *Frankfort* at 40 *d. Sterling* the Florin of 67 *Kreutzers.* The Queſtion is, how many Florins of 63 *Kreutzers* the Florin, he muſt receive at *Frankfort* ?

(4
67 (1 $\frac{4}{63}$ $\frac{9}{1}$
63

40——1 $\frac{4}{63}$——80 *l.*

facit 510 $\frac{10}{21}$.

A Merchant at *Dantzick* doth receive a Bill of Exchange from *London* 3999 Florins, and is for 376 *l. Sterling*, delivered at *London*. I demand at what Price the Pound *Sterling* was delivered, when 30 groſs *Poliſh* make a Florin?

facit 319 $\frac{13}{188}$ *groſs Poliſh.*

At *Antwerp* a Merchant receiveth a Bill of Exchange from *London* of 375 *l. Flemiſh*, for the value received there at 27 *s.* 5 *d. Flemiſh*, the 20 *s. Sterling*: I demand the Sum in *Sterling* Money that was delivered at *London*?

facit 273 *l.* 11 *s.* $\frac{41}{329}$

A Merchant at *London* doth deliver 370 *l. Sterling* by Exchange from *Roan*, at 73 *d. Sterling* for 50 *s. Tournois*: The Demand is, How much he muſt receive at *Roan*, *Tournois*?

facit 60821 *s.* $\frac{67}{73}$ *Tournois.*

A *Spaniſh* Merchant doth receive a Bil of Exchange from *London* of 700 Duckets & 15 for 196*l.* 15*s.* delivered at *London.* I demand at what Price the Ducket was delivered ?

facit 5 *s.* $\frac{87}{14}$

III. *How to know at what Rate we mak the Exchange, tranſporting Money or Ware from one Country to another.*

If a Ducket at *Venice* be worth 120 *s.* an at *London* 5 *s.* 7*d.* at what Price is the Exchange made for the Ducket of 120 *s.* i tranſporting from *Venice* ?

120——————5 *s.* 7 *d*——————112

facit 5 *s.* 2 *d.*

If a *French* Crown at *Hamborough* be wort 45 *s.* *Lubiſh*, and an Angel be worth 78 *s* and at *London* a *French* Crown is worth 6 *s* *Sterling*, and the Angel 11 *s.* *Sterling.* Whether is it better to bring Angels or *Frenc* Crowns from *Hamborough* to *London* ?

It is better to bring French *Crowns by*

If a Piece of Serge be worth 28*s.* *Sterling*, and at *Frankfort* it is worth) a

Charges abated) 17 Florins at 6 *Kreutzers* the Florin, at what Price do I make the Exchange for 66 *Kreutzers* in carrying Serges from *London* to *Frankfort* ?

facit 1 *s.* $\frac{207}{335}$

If a Mark at *Hamborough* be worth 33 *s. Lubiſh*, & at *London* 3 *s.* 7 *d.* at what Price is the Exchange made for 1 *l. Sterling*, in bringing Marks from *Hamborough* to *London*?

facit 184 *s.* $\frac{8}{43}$ *Lubiſh.*

If a *French* Crown be worth 7 *s.* $\frac{3}{5}$ *Flemiſh* at *Antwerp*, and 6 *s.* at *London*, at what Price do I make the Exchange for 1 *l. Sterling* in bringing *French* Crowns from *Antwerp* to *London.*

facit 25 *s.* $\frac{1}{3}$ *Flemiſh.*

If a Dollar at *Dantzick* be worth 39 Groſs, and at *London* 4 *s.* 8 *d.* at what Price do I make the Exchange for 1 *l. Sterling* tranſporting Dollars from thence to *London* ?

facit 167 $\frac{2}{14}$ *Groſs.*

CAHP

CHAP. XXIII.

Of LOSS and GAIN.

1. I Need not go about to acquaint you with the meaning of this Rule, becauſe the words themſelves are ſufficient to inform you, And for its Nature, I ſhall ſhew it you by many and various Queſtions, which indeed are ſomething hard to apprehend, without the well minding of theſe four principal Heads, which, being well underſtood, will carry you through the Difficulties thereof.

As,

Firſt, To know what is gained or loſt *per Cent.*

Secondly, To know how it ſhall be ſold to gain or loſe ſo much *per Cent.*

Thirdly, Having gained or loſt ſo much *per Cent.* to know what it coſt.

Fourthly, There being ſo much gained *per Cent.* when ſold for ſuch a Rate: To know what is gained *per Cent.* when ſold for more, or what is loſt *per Cent.* when ſold for leſs.

Of theſe in Order.

Firſt, To know what is gained or loſt *per Cent. per* Pound, *per* Ell, *per* Yard, *&c.*

Example.

If 1 ℔. of Tobacco coſt 18 *d.* and is ſold for 21 *d.* I demand how much is gained *per Cent? Firſt, ſee what the Gain or Loſs is by Subtraction.*

```
21
18
——
 3
```

Then let the Price it coſt be the firſt Number in the Rule of Three, the Gain or Loſs the ſecond, and 100 *l. the third.*

If 18 gain——3 *l.*——what 100?

facit 16 *l.* 13 *s.* 4*d.*

If a Leather-ſeller buy a Parcel of Leather, for 2 *s.* 10 *d. per* Skin, and ſelleth the ſame again for 3 *s.* 2 *d.* what doth he gain *per Cent.*

```
s.       d.
3———————2  If 34 d. gain 4 d. what 100 l.
2———————10            facit 11 l. 15 s. 3 d. 9/17
——————————
0————————4
```

If I buy an Ell of *Holland* for 6 *s.* 7 *d.* an ſell it again for 5 *s.* 9 *d.* I demand ho much the Loſs is *per Cent.*?

s. *d.*
6——7
5——9

10

If 6 *s.* 7 *d.*——10 *d.*——100 *l.*

facit 12 *l.* 13 *s,* 1 *d.*

If 1 ℔ coſt 10 *d.* and is ſold again for 8 the Queſtion is, What is loſt *per Cent.*?

If 10 *d.* loſe—2 *d.*—what 100 *l.*?

facit 20

If a Piece of Cloth, containing 24 Yar coſt 42 *s.* and 1 Yard is ſold for 2 *s.* 8 *d.* t Queſtion is, How much is gain'd or l *per Cent.*

gained 52 *l.* 7 *s.* 7 *d.* $\frac{3}{7}$ *per Ce*

If a Piece of Silk containing 36 Yar coſt 9 *l.* and 1 Yard; is ſold for 9 *s.* 8 *d* demand whether I gain or loſe, and h much *per Cent.*? *facit* 93 *l.* 6 *s.* 8 *d.* *G*

A Draper hath a Piece of Cloth conta ing 30 Yards, coſt him 14 *s.* the Yard, another Cloth containing 19 Yards, coſt the Yard, and he ſells them one with a ther for 13 *s.* the Yard: I demand whet e doth gain or loſe, and how much *per* *ent.* —1 $\frac{5}{7}$ *facit gains per Yard.*

facit 15 *l.* 3 *s.* 9 *d.* $\frac{31}{53}\frac{5}{5}$ *Gains per Ell.*

If 1 Yard coſt 3 *s.* ready Money, and is old again for 3 *s.* 4 *d.* for 8 Months: I demand how much is gained *per Cent. per Ann.* ithout Intreſt upon Intreſt?

facit 16 *l.* 13 *s.* 4 *d. Gains.*

If 1 Yard of Cloth 9 *s.* ready Money, and ſold for 8 *s.* the Yard for 16 Months, e Queſtion is, How much is loſt *per Cent.* r *Annum*, without Loſs upon Loſs?

facit 11 *l.* 2 *s.* $\frac{2}{9}$ *for* 16 *Months:*
loſt—8 *l.* 6 *s.* $\frac{1}{4}$ *for* 12 *Months.*

If I buy Cloth for 6 *s.* a Yard for 8 Mon. d ſell the ſame again for 5 *s.* 6 *d.* ready oney, how much do I loſe *per Cent. per* *nnum*?

Queſtions of this Nature are to be reſolved at two workings by the Rule of Three us.

If 6 *s.* loſe———6 *d.* ——what 100 *l.*
facit 2000 *d.*

If 8 Mon. loſe—2000 *d.*—what 12 Mon-
facit 12 *l.* 10 *s.*

If I buy Cottons for 3 *s.* a Yard for 5 Months, and ſell them again for 3 *s.* 2 *d.* ready Money: The Queſtion is, how much I gain *per Cent.* allowing 6 *per Cent. per* Intereſt?

Firſt, See what they coſt in ready Money.

Thus:

102 *l.*——10 *s.*——100 *l.*——3 *s.*

facit 2 *s.* 11 *d.* $\frac{5}{41}$

2 *s.*——11 *d.* $\frac{5}{41}$——2 *d.* $\frac{63}{41}$——100 *l.*

facit 8 *l.* 3 *s.* 10 *d.* $\frac{2}{3}$ Gain *per Cent.*

A Grocer doth ſell Cloves for 4 *s. per* ℔ ready Money: The Queſtion is, how long time he muſt demand, when he doth buy the ſame Cloves at 3 *s.* 8 *d.* the Pound, to Gain 13 *l. per Cent. per Annum*, without Gain upon Gain, at 6 *per Cent.* Intereſt.

Firſt, See what the Gain is, if bought at 3 *s.* 8 *d.*

Thus:

3 *s.*——8 *d.*——4 *s.*——100 *l.*

facit 109,

Here is gained but 9 *l.* $\frac{1}{11}$, but he muſt gain 13 *l.* that is 3 *l.* $\frac{10}{11}$ more, which muſt be gained by Time: Therefore ſay,

If 6 *l.*——12 *Mo.*——3 *l.* $\frac{10}{11}$

facit 7 *Mo.*

A Linnen Draper hath ſeveral ſorts of Cloth, *viz.* 470 Ells at 2*s.* 10*d. per* Ell ready Money, 730 Ells at 2 *s.* 6 *d. per* Ell ready Money, and 179 Ells at 3 *s.* 10 *d, per* Ell ready Money, he ſells the Ell one with another for 2*s.* 2 *d.* to be paid $\frac{1}{2}$ at 5 Mon. $\frac{1}{4}$ at 6 Mon. & the reſt at 9 Mon Intereſt at 6*l. per Cent.* I demand what is loſt *per Cent.*

Ells.		*s.*	*d.*		*l.*	*s.*	*d.*
470	a	2	10	is	66	11	08
730		2	6		91	05	00
179		3	10		34	06	02
1379 Ells coſt					192	02	10

1379 Ells ſold at 2*s.* 2*d.* is 149*l.* 7*s.* 10*d.* Which Sum being to be received as above-ſaid, will by Rebate at 6 *l. per Cent.* come to no more than 144 *l.* 17 *s.* 4*d.* Then ſay,

If 192*l.* 10*s.* 10*d.* 100 *l.* 144 *l.* 17 *s.* 4 *d.*
facit 24 *l.* 12 *s. per Cent.* Loſs.

The Second Head.

To know how a Commodity muſt be ſold to gain or loſe ſo much per Cent.

Example.

If 1 ℔ of Nutmegs coſt 9*s.* 2*d.* how much muſt it be ſold for to gain 6 *l. per Cent.*

Let 100 l. *be the firſt Number in the Rule of Three, the Price the ſecond, and* 100 l. *with the Profit added, or on the Loſs ſubtracted, the third Number.*

If 100 *l.* be 9 *s.* 2 *d.* price, what 106 *l.*

facit 9 *s* 8 *d.*

If a Barrel of Gun-powder coſt 3 *l.* how muſt it be ſold to loſe 9 *l. per Cent ?*

If 100———3 *l.*———what 91 *l.*

facit 2 *l.* 14 *s.* 7 *d.*

If one Gallon of Sack coſt 5 *s.* 10 *d.* for how much muſt it be ſold to loſe 8 *l. per Cent.*

If 100 *l.*———05 *s.*——10 *d.*——92 *l.*

It muſt be ſold for 5 *s.* 4 *d.*

If 90 Ells of Cambrick coſt 60 *l.* for how much muſt one Yard be ſold to gain 8 *l. per Cent.*

It muſt be ſold for 12 *s.* 7 *d.*

If a Bag of Hops, weight 16.*C.*1 *qr.* 12 coſt 27*l.* 6*s.* 8*d.* for how much muſt the *C.* weight be ſold to loſe 8 *l. per Cent.*

facit coſt *per C.* 1*l.* 13*s*: 3*d.*

Sold to loſs *per C.* 1*l.*10*s.* 8*d.*

A Sugar Baker hath 736 ℔ of Sugar that coſt 13*d.* a Pound, & 137 ℔ 12*d.* a Pound

I demand how he muſt ſell the Pound on with another, to gain 9 *l. per Cent.* Firſt ſee what one Pound coſt. *facit* 12 *d.* $\frac{736}{875}$

It muſt be ſold for, to gain 9 *l. per Cent.*

1*s.* 1 *d.* $\frac{21802}{21875}$.

If a Pound of Mace coſt 8 *s.* how muſt it be ſold to gain 24 *l. per Cent.*?

facit 9 *s.* $\frac{23}{25}$

If 5 Yards coſt 5 *l.* ready Money, for how long time muſt it be ſold for 95 *s.* to loſe 20 *l. per Cent.*. without Loſs upon Loſs?

If I lay out 100 *l.* ready Money, & muſt eceive but 95 *l.* there is 5 *per Cent.* Loſs; but I muſt loſe 20 *l. per Cent.* that is 15 *l.* more, ſo that I muſt ſell my Goods, as if I ſold that which coſt me 100 *l.* for 80 *l.* Therefore ſee in what time 80 *l.* will amount to 95 *l.* at 6 *per Cent.* and that will nſwer the Queſtion.

If 100 *l.* loſe 6 *l.* in 12 Months in what ime ſhall 95 *l.* loſe 15 *l.*?

Or thus,

f 100 *l.*——6 *l.*——80 *l.*

facit 4 *l.* 16 *s.*

l.——16 *s.*——12——15 *l.*

If

If 1 ℔ coſt 23 *d.* ready Money, for how long time muſt it be ſold for 25 *d.* to gain 11 *l. per Cent. per Annum* at 6 *per Cent.*

Suppoſe I ſell for 12 Months time, then I gain in the Price 8 *l.* $\frac{16}{23}$.

As thus:

If 23 *d.*——100 *l.*——25 *d.*

facit 108 $\frac{16}{23}$

But I muſt gain 11 *l.* that is, 2 $\frac{7}{23}$ more; therefore this muſt be gained by Time:

Thus:

6 *l.*——12 *Mon.*——2 *l.* $\frac{7}{23}$.

facit 4 *Mon*

This 4 Mon. $\frac{24}{138}$ muſt be ſubtracted from 12 Months, and the Remainder is the Anſwer to the Queſtion.

facit 7 *Mon.*

If 1 Yard coſt 2 *s.* 9 *d.* ready Mony, what rate muſt it be ſold for 3 Mon. $\frac{1}{2}$, loſe 8 *l. per Cent.*

Firſt, ſee what Rate it muſt be ſo for in ready Money to loſe 8 *l. per Ce*

Thus

100 *l.*——33 *d.*——92 *l.*

facit 30 *d.*

If 30 *d.* $\frac{9}{25}$ be a ready Money price I m muſt ſell it for no more, in regard I muſt ſtay 3 Mon. $\frac{1}{2}$ for my Money : Therefore let 100 *l.* be your firſt Number, & 100 with the Intreſt for three Mo. $\frac{1}{2}$ be the ſecond Number, & the laſt *facit* your 3 d. Mumber. thus : 100——101 *l.* 15 *s.*——30 *d.* $\frac{9}{23}$

facit 30 *d.* $\frac{8713}{46000}$

A Mercer buyeth Silk at 14 *s.* a Yard for 7 Months ; at what Rate muſt he ſell it again for ready Money to gain 16 *per Cent.* without Gain upon Gain ?

Firſt, ſee what the Yard is worth in ready Money, thus :

103 *l.*———10 *s.*———100 *l.*———14 *s.*

facit 13 *s.* $\frac{109}{207}$

Then ſay, if 100 *l.*—-13 *s.* $\frac{109}{207}$—-116 *l.*

facit 15 *s.* $\frac{145}{207}$

The third Head.

When there is gained or loſt per Cent. *to know what the Commodity coſt.* *Example.*

If 10 Yards of Cloth be ſold for 16 *s. per* Yard, and there be 6 *l.* 10 *s.* Loſs *per Cent.* the Quſtion is, How much the 10 Yards coſt?

First, ſubtract the Loſs from the 100 *l.*

6—10

93—10

2. Let

2. Let the Remainder of 100 *l.* when there is Loſs; and the Gain added 100 *l.* when there is Gain, be the firſt Number; let the Price be the ſecond Number, and 100 *l.* the third.

If 93 *l.* 10 *s.* ——— 8 *l.* ——— 100 *l.*

facit 8 *l.* 11 *s.* $\frac{23}{187}$

If 20 Pound of Clowes be ſold for 7 *s.* the Pound, and I Gain 9 *l. per Cent.* the Quſtion is, How much the whole 20 ℔. coſt me?

20

7

14||0

7

109 *l.* ——— 7 *l.* ——— 100 *l.*

facit 6 *l.* $\frac{46}{109}$

If I ſell 28 Ells of Cloth for 4 *s. per* Ell, and thereby loſe 24 *per Cent.* I demand what the whole piece coſt?

76 *l.*—112 *s.*—100 *l.* *facit* 7 *l.* 7 *s.* $\frac{7}{19}$

If 13 C. $\frac{1}{2}$ of Indico be ſold for 36 *l.* and I gain 13 *l. per Cent.* I demand how much the C. weight coſt?

113—36—100 *facit* 32 *l.* $\frac{14}{11}$

If 276 Fother of Lead, each 19 C $\frac{1}{2}$ b ſold for 256 *l.* at 5 Mo. and I gain 11 *per Cen* *per Ann.* The Queſtion is, How much the whole coſt ready Money?

$12\frac{55}{12}$——256——100 *facit* $244\frac{106}{256}$.

The Fourth Head.

If by Wares ſold at ſuch a Rate there is ſo much gained or loſt per Cent. *how to know what would be gained or loſt, if ſold at another Rate.*

Example.

If Cloth ſold at 8 *s.* the Yard be 10 *per Cent.* Profit; what Gain or Loſe *per Cent.* ſhould I have had, if ſold at 7 *s. per* Yard?

In Queſtions of this Nature, let the firſt Price be the firſt Number, 100 l. *with the Profit added or Loſs ſubtracted, the ſecond Number, and the other Price the third Number.*

Example.

If 8 *s.*——110*l.*——7 *facit* 96 *l.* $\frac{1}{4}$

loſt per Cent. 3 *l.* $\frac{3}{4}$

If one Gallon of Wine be ſold for 9 *s.* and I loſe 8 *per Cent.* how much ſhall I gain or loſe when 2 Gallons are ſold for 25 *s.* 10 *d.*

If 27 *s.*——92 *l.*——25 *s.*——10 *d.*

facit 11 *l.* $\frac{79}{81}$ *per Cent. Loſs.*

If 10 Yards be ſold for 4 *l.* 10 *s.* and I loſe 12 *per Cent.* what ſhall I gain or loſe it I ſell the ſame for 9 *s.* 9 *d per* Yard?

9 *s.*——88 *l.*——9 *s.* 9 *d.*

facit 4 *l.* 2 *Loſs per Cent.*

CHAP. XXIV.

Of ALLIGATION.

I. ALLigation is ſo named becauſe it teacheth to knit or bind together divers Things of unequal Prices, whereby to find how much of each muſt be taken according to the Queſtion propounded.

It is commonly divided into two parts, *viz.*

Alligation Medial. and

Alligation Alternate.

II. *Alligation Medial* ſimple in it ſelf is no more than to diſcover or find out a common Medium, Rate, Price, or Proportion in the Mixture of divers Things together, which is perform'd by reducing the ſeveral Prices to one Denomination.

Then multiply the Quantity of each Parcel by its Price, and add all the Product together, the which Total divide by th Number of all the Parcels that are to b mixed, and the Quotient is the anſwer t the Queſtion demanded. For.

As the whole Quantity is to the whol Price; ſo is 1 *to its own Price.*

Example. A Meal-man hath ſeveral ſorts of Meal of ſeveral Prices, and would mix them ſo, that the Quantity mixed might be one common Price, *viz.*

3	Buſhels at	3 *s.* 5 *d.*	a Buſhel.
4		5 *s.* 6 *d.*	
6		4 *s.* 8 *d.*	

Now the Quſtion is, What one Buſhel of this Mixture is worth?

Buſh. *s.* *d.*	*Buſh.* *s.* *d.*	*Buſh.* *s.* *d.*	
3 at 3—5	4 at 5—6	6 at 4—8	
3	5	4	*s.* *d.* *Buſh.*
			10—3—3
9	20	24	22—0—4
1	2	3	28—0—6
0—3		1	
	22 *s.*	—6	0—3—13
10 *s.*—3 *d.*		28	

l. *s.* *d.* 3 *l.* 0 *s.* *d.*

13——3—0—3——1

facit 4 *s.* 7 *d.* , $\frac{8}{3}$ *per Buſhel*.

A Hoſtler mixed Provender for Horſes, *viz.*

				s. *d.*	
5	Buſhels of	Oats	at	3—6	*Buſh.*
3		Oats		4—8	
2		Malt		2—2	
4		Beans		5—3	

The Queſtion is, What 1 Peck of this Mixture is worth? K 4

buſh. s. d. buſh. s. d. buſh. s. d. buſh. s. d.
5 at 3—6 3 at 4—8 2 at 2—2 4 at 5 —2

Reduce each Quantity into Pecks, each Price into Pence, and multiply one by the other : Then ſay as before,

If 56 Pecks —682 *d.* 1 Peck *facit* 12 *d*

How to prove Alligation Medial.

Compare the total Value of the ſeveral Mixtures with the Value of the whole Mixture, and if they come alike, the Work is true ; as in the former *Example* may appear.

		s.	*d.*	*l.*	*s.*	*d.*
5	Buſhels at	3	6	0	17	6
3		4	8	0	14	0
2		2	2	0	04	4
4		5	3	1	01	0
				2	16	10

(1
8 (0
682 (5‖6
222
x 2—16—10

An Alehouſe-keeper mixed 3 Sorts of Ale together; *viz.* 15 Gall. at 4 *d.* $\frac{1}{2}$. *per* Gall 22 Gall. at 5 *d. per* Gall. 20 Gall. at 6 *d. per* Gall. The Queſtion is, What one Gallon of this Mixture is worth? *facit* 5*d.* 0 *q.* [illegible]

A Refiner having 10 ℔ of Silver Bullion of 8 Ounces fine, 12 ℔ of 6 Ounces fine & 11 ℔ of 9 Ounces fine, is deſiours to melt all together, and to know of what Fineneſs a Pound weight of this Maſs ſhall be?

℔. ℔. ℔
10——12——11
8——6——9

80——72——9

11	80
12	72
10	99
33	251

33—251—1 *facit* 7 *oz.* $\frac{20}{33}$ *fine.*

Or thus.

10 ⨯ 12 ⨯ 11 = 33
10 X 8 = 80
12 X 6 = 72
11 X 9 = 99

Then ſay,
If 33——251——1
facit 7 *oz* $\frac{20}{33}$ *fine.*

Note, That a ⨯ thus doth ſignify *Addition,* and two Lines thus = *Equality* or *Equation,* but a X thus, *Multiplication.*

III. It will be neceſſary here to aquain quaint you, that as Silver is eſtimated 12 Ounces to the Pound, and 20 Penny weight to the Ounce; ſo an Ounce of Gold is divided into 24 Parts called Caracts: Now Refiners, Goldſmiths, and Mint-maſters, do diſtinguiſh the different Fineneſs of either according as it indureth the Fire. As for Example: If an Ounce of Gold being tried, loſeth 3 Caracts, it is eſtimated 21 Caracts fine, if it loſeth 10 Penny-weight, it is eſteemed 11 Ounces 10 Penny-weight fine, *&c.*

A Goldſmith is to melt 9 ℔ 4 ℥ $\frac{1}{2}$ of Gold Bullion of 16 Caracts fine with 7 ℔ 6 ℥ of 22 Caracts fine: The Queſtion is, How many Caracts fine a Pound of this Mixture is worth?

Reduce them into $\frac{1}{2}$ Ounces; and work as before.

facit 18 *Car.* $\frac{54}{81}$ *fine.*

Or thus:

225 ⋈ 16—3600 225 ⋈ 180—405
180 ⋈ 22—3960

Then ſay,

If 405——7560—1 *facit.* 18 *Car.* $\frac{51}{81}$ *fine*

A Mint-maſter hath 60 ℔ weight of Gol

of 23 Caracts fine, and 80 ℔ weight of 19 Caracts fine; the Queſtion is, wether there ought any Alloy to be mixed with it to make a Pound of this Mixture to be 21 Caracts fine.

An Alloy is a Mixture of ſome baſer Metal, as Copper, &c. to moderate the Fineneſs of it.

23	19	1380	60
60	80	1520	80
300	1520	2900	140

140 ——— 2900 ——— 1 *facit* 20$\frac{5}{7}$ Caracts fine; but it ſhould be 21 Caracts fine; Wherefore I conclude this Mixture is ot fine enough by $\frac{2}{7}$ of 20 Caracts fine; herefore no Alloy is to be uſed, but more Gold to be put in.

The Second Part of the Rule of Alligation.

1. The former Rule requir'd only a comon Rate or Price from the whole of ſevel Quantities mixed together; but this quires a Price and Quantity in general, mpoſed of ſuch Particulars as the Mixre is to be made of, and the Parts to be ken proportionably according to the Price, uantity or Quality of each one

Example.

A Tobacconiſt having ſeveral ſorts o Tobaccos, as ſome at 2 *s.* a Pound, other at 3 *s.* a Pound, others at 6 *s.* a Pound, an the beſt at 7 *s.* a Pound, and is deſirous t mix 112 Pound together, ſo that he migh ſell the whole Mixture for 4 *s.* a Pound the Queſtion is, what Quantity of each mu be taken to make up this Mixture ?

In order to the working of this Queſtio and others following.

Firſt, ſet down the common Number, o Price propounded (towards the left-hand which is 4 *s.* and likewiſe the Prices give *viz.* 2 *s.* 3 *s.* 6 *s.* 7 *s.* thus orderly one u der another, as you have learned in A dition.

$$4\begin{cases}2\\3\\6\\7\end{cases}$$

2. Obſerve what Sums are greater, a what are leſſer than the common Numbe and couple a greater and a leſſer togethe by making a Simicircle from one to t other ; for two greater or two leſſer cann be mixed together,becauſe two leſſer bei thus taken can never make ſo many as t

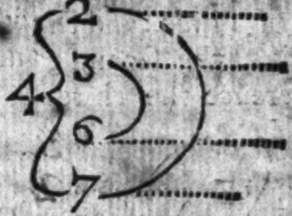
ſorts
d, other
ound, an
leſirous t
he migh
a Pound
each mu
e ?
Queſtio

Number,
left-hand
ices give
ly one u
ed in Ad

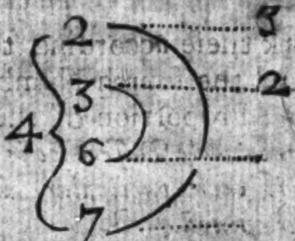
reater, a
n Numbe
er togethe
one to t
eſſer cann
leſſer bei
as t

---

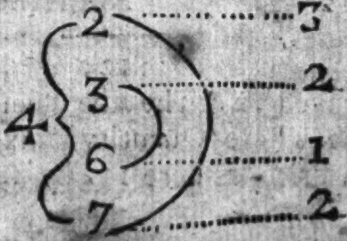
common Number, & two greater will
too many;



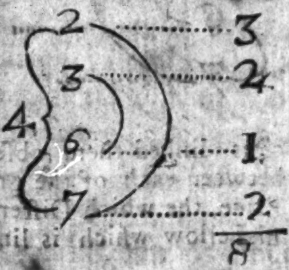
3. Having thus linked them obſerve what th
Difference is between each of the greaterSums &
the common Price, the which Difference is ſet directly againſt hisFellow which is linked with hi



Then likewiſe mark the Difference betwee
the leſſer Numbers and the common Numbe
and ſet each Difference thereof againſt tha
which is linked with it.



Laſtly, add all the Differences into one um, which ought to be the firſt Number n the Rule of Three; and the whole Quaniy to be mixed the ſecond; and each paricular Difference the third.



Then work theſe according to the Rule f Three; and the fourth Number will delare the exact Proportion of the Mixture.

For, *As the whole Difference is to the whole Quantity; ſo is each particular Difference to ach particular mixed.*

l.

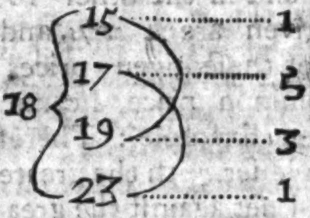
8—112—3 } *facit* { 42 of the firſt Sort.
8—112—2 } *facit* { 28 of the ſecond.
8—112—1 } *facit* { 14 of the third.
8—112—2 } *facit* { 28 of the fourth.

112

To prove this & the like Queſtions, muliply the whole Quantity mixed by the ommon Price, as here 112 by 4, *facit* 448.

2. Multiply all the particular Quantities und by its own Price, as 42 by 2, 28 by &c. and if the Total of all the Products gree with the former Sum (448) your Work is well done.

A Vintner hath four ſorts of Wine of everal prices, *viz.* ſome of 15 *d.* a Gallon, 7 *d.* a Gallon, 19 *d.* a Gallon, and 23 *d.* Gallon; of which he is minded to mix he Quantity of 32 Gallons. The Queſtion , How many Gallons he muſt take of each ort to make the Gallon worth but 18 *d.*



10

				Gall.
10 ——	32 ——	1	*facit*	$3\frac{1}{5}$
10 ——	32 ——	5		16
10 ——	32 ——	3		$9\frac{3}{5}$
10 ——	32 ——	1		$3\frac{1}{5}$
				32

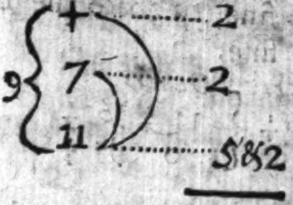
A

A Durggiſt had 3 ſorts of Drugs one was valued at 4 *s.* the Pound, another ſort at 7 *s.* the Pound, the third ſort at 11 *s.* a Pound; out of theſe ſorts he made two Parcles, either of them to be 30 Pound weight, whereof one of them thus mixed to be ſold for 9*s.* the Pound, and the other for 10 *s.* and the other for 10 *s.* the Pound: How many Pound muſt be taken of either ſort to make each mixture.

The price propounded in the firſt propoſition is 9*s.* and in the other 10 *s* Likewiſe the prices given are 4 *s.* 7*s.* and 11 *s.* But ſeeing two of theſe given prices are leſſer than the common price, I cannot proceed to the former Example: Therefore I couple the two leſſer with the greater, & their Differences I ſet againſt the greater, & the Differences of the greater againſt the two leſſer: Then work as before. For,

As 11 the whole Difference, is to 30 the whole Quantity; ſo is 2 the firſt Difference unto 5 and $\frac{5}{7}$ *for its Qnantity.*

Propoſition I.



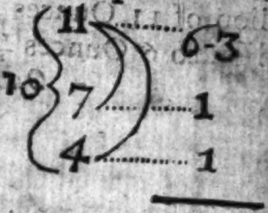
11

11—30—2 *fa.* 5 $\frac{5}{11}$

1—30—2 *fa.* 5 $\frac{5}{11}$

1—30—7 *fa.* 19 $\frac{1}{11}$

Propoſition II.



11

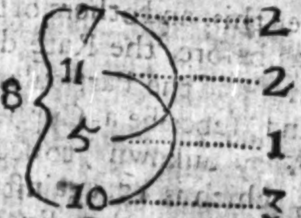
11—30—9 *fa.* 24 $\frac{6}{11}$

11—30—1 *fa.* 2 $\frac{8}{11}$

11—30—1 *fa.* 2 $\frac{8}{11}$

Barley at 7 Groats the Buſhel, Wheat at 11 roat the Buſhel, of Rye at 5 Groats the uſhel, and Oats at 10 Groats the Buſhel, are to be mixed, as 100 Buſhels of the mixture ay be ſold for 8 Groats the Buſhel: queſtion , How much muſt be taken of each ſort?

30 30



—100—3
—100—2
—100—1
—100—3

facit
33 $\frac{3}{9}$ Barley.
32 $\frac{2}{9}$ Wheat.
11 $\frac{1}{9}$ Rye.
33 $\frac{3}{9}$ Oats.

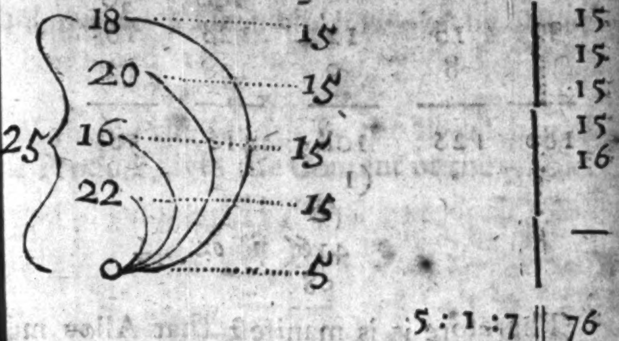
How much Alloy muſt I mix with Bu lion of 11 Ounces $\frac{5}{6}$ fine, to abaſe the Bullion to 6 Ounces $\frac{1}{2}$ fine.

$$\begin{array}{lcl} \textit{Ounces} & & \textit{Ounces} \\ 6\frac{1}{2} & \left\{ \begin{array}{l} 11\frac{5}{6}\ )\ 6\frac{1}{2} \\ 0\ )\ 5\frac{1}{3} \end{array} \right. & \end{array}$$

By this Alligation there muſt be taken Ounces and $\frac{1}{3}$ of Alloy, to mix with the *oz.* $\frac{1}{2}$ of Bullion.

A Gold ſmith hath 4 Sorts of Gold, o finer then another ; whereof one is 18 Caracts fine, another 20, another 16, an the fourth 22 Caracts fine : All theſe h would mix with ſuch an Alloy, as that th whole mixture of 150 *oz.* ſhould be 15 Caracts fine : The Quſtion is, How much mu be taken of each ſort ?

To anſwer this, and others of this Natur ſet down, as before, the Rate demanded the left-hand, and the Particulars under o another, and ſubcribe a Cypher under (for the Alloy unkown) to ſet the Alloy Difference, which is 15, againſt all the oth Sums, according to the Example. Th work as before, ſaying, *As 76, the wh Difference, is to 150, the whole Quantity ; ſo each particular Difference to the Quantity ſoug*



76——150——15 } { 29 $\frac{23}{38}$
76——150——15 } *facit* { 29 $\frac{23}{38}$
76——150——15 } { 29 $\frac{23}{38}$
76——150——15 } { 29 $\frac{23}{38}$
76——150——16 } { 31 $\frac{22}{38}$

150

A Refiner hath ſevral Sorts of Bullion, z. 30 lb of *6 oz.* fine, *6* of 8 *oz.* fine, 12 lb 9 *oz.* fine; and he would ſo mix them gether, that a Pound thereof ſhould bear Ounces fine. The Demand is, Whether y Alloy ought to be mixed with it, and w much?

First, See by Alligation Medial what neneſs an Ounce of this Mixture will ar when mixed together, then work as in e laſt Queſtion ſave one.

180

$$\begin{array}{c|ccccc} & & & & 180 & 30\\ 30 & & 16 & 12 & 128 & 16\\ 6 & & 8 & 9 & 108 & 12\\ \hline 180 & & 128 & 108 & 416 & 58 \end{array}$$

$$\begin{array}{l} (1\\ \;(0\\ \cancel{4}\cancel{1}6(7 \text{ oz. } \frac{5}{29}\\ \;\cancel{5}8 \end{array}$$

Therefore it is manifeſt that Alloy mu
be mixed to Alloy from 7 *oz.* $\frac{5}{29}$ to 6 *o*
which is to be done thus; and you will fin
for every *6* Ounces of Bullion he muſt tak
1 *oz* $\frac{5}{29}$ of Alloy to mix with it.

$$6\left\{\begin{array}{l} 7\,\frac{5}{29}\,(\;6\\ 0\text{———}1\frac{5}{29} \end{array}\right.$$

$$\begin{array}{c} \hline 7\,\frac{5}{29} \end{array}$$

C H A P. XXV.

Of Inſtructions for the Meaſuring of a Superficies, Board, Glaſs, Hangings, Pav ments, &c.

I. OBſerve, That Board and Glaſe a uſuall meaſured by the Foot, a the Foot, containeth 144 Inches.

The

There is a Table 24 Foot in length, and Foot wide. I Demand how many Foot s contained therein?

The Rule is,

Multiply the length by the Breadth, and he Product gives the Content of the whole.

$$\begin{array}{r} 24 \\ 3 \\ \hline \end{array}$$

facit 72 *Foot.*

There is a Table of 20 Foot 9 Inches ong, and 3 Foot 8 Inches broad; how any Foot doth it contain?

Reduce them into Inches, and multiply s before.

facit 76 *Foot* $\frac{1}{12}$

How to meaſure Glaſs.

There is a Houſe hath 26 Panes of Glaſs the Window, each Pane being 4 Foot 3 ches long, and 18 Inches wide: the Queion is, How many Foot of Glaſs is conined in all.

facit 87 *Foot* $\frac{3}{4}$

Pavements and Hangings are uſually eaſured by the Yard.

One Yard in length is 3 Foot.

One Yard ſquare upon the Superficies is Foot.

How

How to meaſure Pavements.

There is a Piece of Ground to be paved, containing 49 Yards in length, and 31 Yard in breadth; how many Yards is containe therein?
facit 1519 *Yards*

A Gentleman had his Door paved, bein 37 Yards 2 Foot one way, and 7 Yards Foot the other way: I demand how many Yards are there in all? *facit* 226 *Yards* $\frac{1}{9}$

A Sute of Hangings 45 Yards $\frac{1}{2}$ long an 2 Yard $\frac{1}{4}$ broad; how many Yards are ther in all?

Divide by 16, becauſe 16 Quarters is Yard ſquare. *facit* 102 *Yards*

Inſtructions for the meaſuring of Solids, as Timber and Stone &c.

12 Inches is 1 Foot in length.
144 Inches is 1 Foot ſquare Superficies.
172 Inches is 1 Foot Solid.

There is a Stone of 4 Foot long, 3 Fo broad, and 2 Foot deep; I demand ho many ſquare Foot is contained therein?

The Rule is,

Multiply the three Demenſions one into another, and the Product is the Anſwer.

facit 24 *Foot.*

A Stone of 5 Foot, nine Inches long, 4 Foot 7 Inches broad, 2 Foot 8 Inches deep, I demand how many Foot their is contained in the ſaid *Stone* ?

Reduce all the Dimenſions into Inches, and divide by 1728.

facit 70 , 1 , 8 , ^{5}

How to Meaſure Timber.

A Piece of Timber 20 Foot 8 Inches in length, 2 Foot 5 Inches broad, and 2 Foot thick ; how many Foot doth it contain ?

facit 99 *Foot* $\frac{8}{9}$

A Country-man borrow'd of his Neighbour a Stack of Hay, the Contents whereof was 40 Foot ſquare : ——When the time of Payment came, he told his Neighbour he could not pay him altogether, but he would pay him 20 Foot ſquare at that time, and 20 Foot ſquare more at another time afterwards, which he performed. The Queſtion is, Whether he paid the whole Quantity borrowed, or what was wanting thereof ?

40

40	20
40	20
1600	400
40	20
64000 *borrowed.*	8000
	8000
	16000 *paid.*

So that he paid but one Quarter of th Quantity he borrowed.

There are many things of this Natur that might be brought in under theſe tw heads, which are more difficult, as the me ſuring of Land of ſeveral Forms, and th Meaſuring of Timber, Stone, or oth things not equally ſquared; the well m naging thereof would require a Treati of it ſelf, which I omit, in regard it do not ſo much concern my Practice, nor m Intention in this Tract; but I judge th ſufficient for the preſent.

Laus Deo.

FINIS.